JANUARY 1954

WIRE AND WIRE PRODUCTS

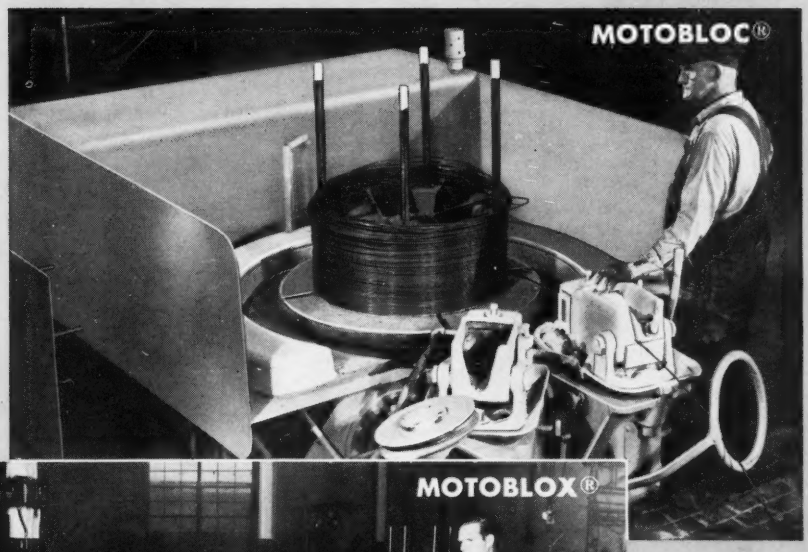
HE

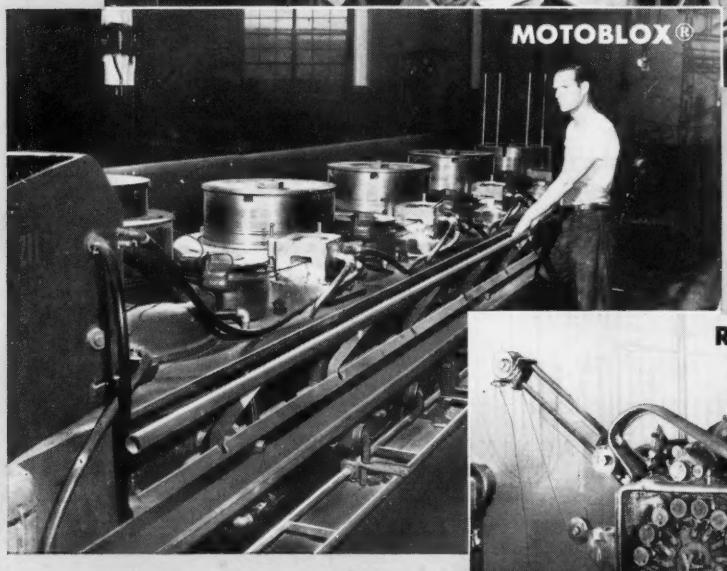
BIG 3

in today's Highspeed Wire Production!

Vaughn®

WIRE DRAWING MACHINERY





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OTOBLOC . . MOTOBLOX . . RINGBLOX! ree famous Vaughn wire drawing achine types that are basic in profitable ire production, handling the most exact- g assignments with speed, ease and mplete dependability. There's a size each that will match your precise eeds—*write us.*

"Quick on the Draw!"

THE VAUGHN MACHINERY CO.
CUYAHOGA FALLS, OHIO, U. S. A.

COMPLETE COLD DRAWING EQUIPMENT . . . Continuous or Single Hole . . . for the Largest Bars and Tubes . . . for the Smallest Wire . . . Ferrous, Non-Ferrous Materials or their Alloys.

OFFICIAL PUBLICATION OF THE WIRE ASSOCIATION

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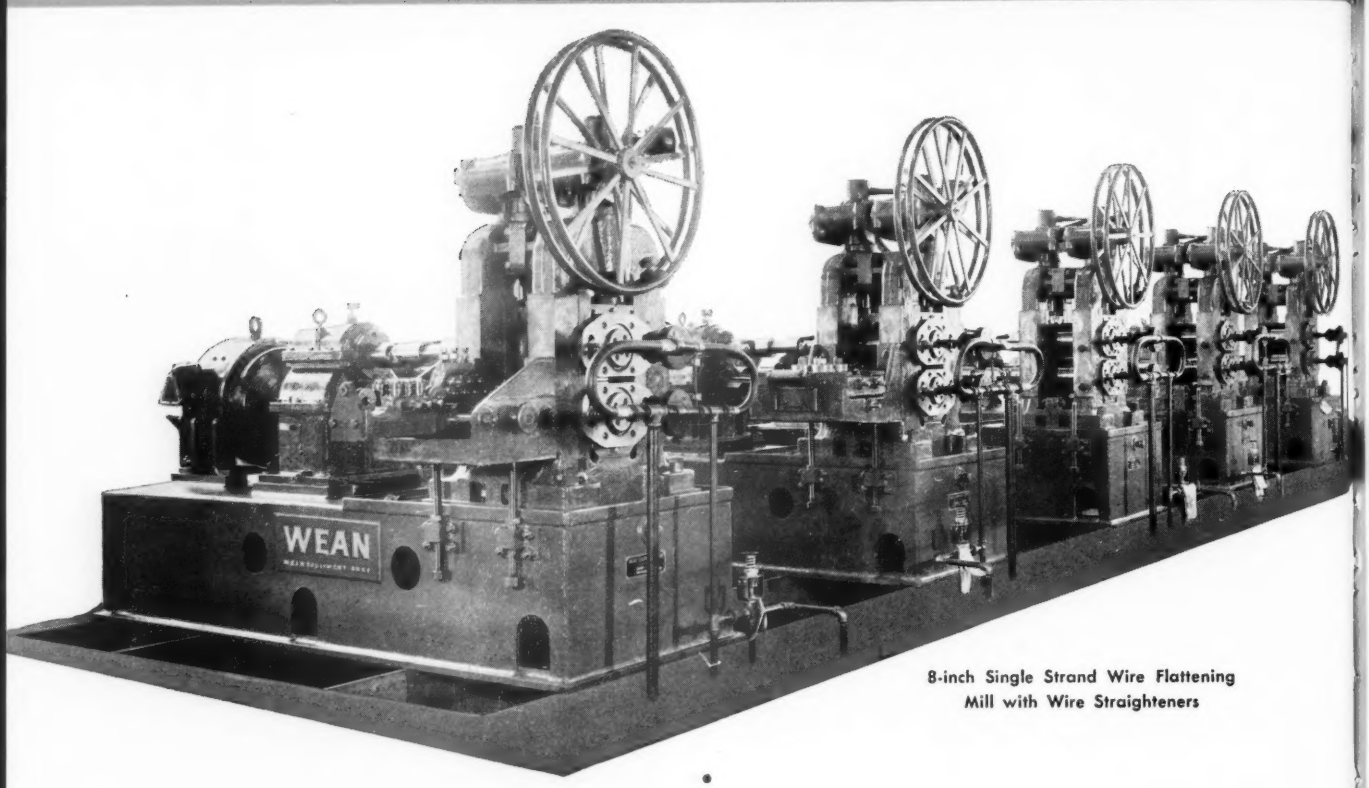


8-inch Single Strand Wire Flattening Mill with Wire Straighteners

A COMPLETE ENGINEERING SERVICE FOR WIRE MILL INSTALLATIONS

Complete Installations for Electro Galvanizing, Hot Dip Galvanizing, Patenting, Tinning, Wire Flattening, Nail Galvanizing and Blueing.

Complete Equipment for the Manufacture of Hexagon Netting, Hinge Joint Fence and Barbed Wire.

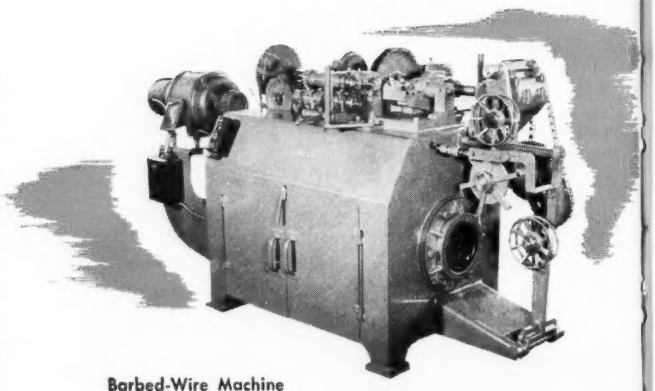
CHECK WEAN FIRST FOR WIRE MILL EQUIPMENT

STRIP MACHINERY

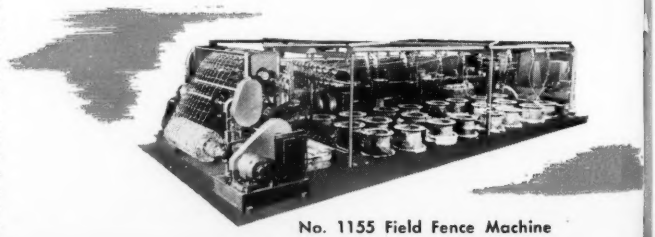
Slitting Installations. Cut to Length Installations. Bearing Metal Coating Installations. Two-Hi Rolling Mill Applications. Strip Grinding Installations. Levelers, Uncoilers, Pinch Rolls, Shears for Strip Processing lines.

WEAN EQUIPMENT CORPORATION

22800 LAKELAND BLVD. • CLEVELAND, OHIO



Barbed-Wire Machine



No. 1155 Field Fence Machine

Wean Equipment Corporation

CLEVELAND, OHIO

WHAT DOES FIRTH STERLING OFFER YOU?

(ANSWER NUMBER 4)

RESEARCH THAT ANTICIPATES TOMORROW'S NEEDS

Our objective is to help *you* solve the technical and metallurgical problems of an *atomic* age *before* they arise . . . not *after*. So, at Firth Sterling, constant emphasis is on full-scale research, development, and production in specialty steels, carbides, new metals, and new methods.

Out of this determination to be ahead, not just abreast of need, has come this amazing three year record of achievement in *your* interest:

- A method of heat tinting that makes *Color Metallography* practical for determining the exact structure-property relationship of carbide mixtures.*
- New metals of great present and future potential that include heavy metal, three grades of chromium carbide, titanium carbide, and high temperature alloys.
- Cermets—those amazing hybrids of ceramic and metal, possessing in *combination* the best characteristics of each, to overcome modern technological problems.
- Zirconium—in ingot, billet, bar, rod, strip, sheet, wire, and tubing form—soon to be available for industrial applications.
- A new chemical plant, employing the most advanced processes and equipment, producing ammonium paratungstate of the highest *purity* to improve the quality of our tungsten carbides.
- Method "X"—an electro-mechanical process for machining metals that are unmachinable by conventional means.

Yes, all these are the result of "accent on research" . . . the justification for our statement

Firth Sterling Stands for Metallurgical Achievement—Past, Present, Future

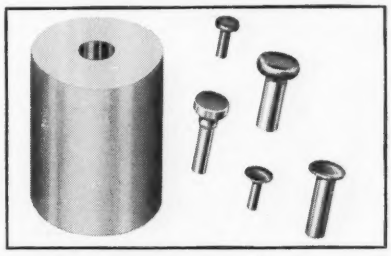
**Write for reprint of article from Oct. 19, 1953 issue of STEEL.*

I-4

DIE SPECIALISTS to the WIRE INDUSTRY

A COMPLETE LINE . . . CARBIDE AND STEEL

Firth Sterling offers wire manufacturers and fabricators the advantages of a *single* source of supply of materials for both tungsten carbide and tool steel drawing, shaping, forming and heading dies. This *complete* line, from famous Firthaloy, for maximum performance where carbide is a requirement, through almost one hundred grades of high speed and tool steels for cut-off knives, roll guides, die casings,

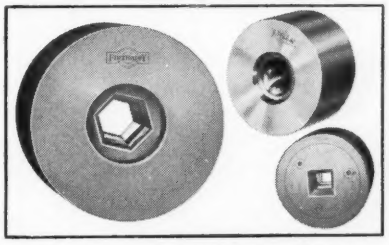


Carbide or steel heading dies—choose from the *complete* line which material best suits your needs.

forming rolls and similar applications, saves you time and money.

Standard items are available from warehouse stocks; others may be obtained from your local tool and diemaker.

Firth Sterling representatives are skilled in interpreting the needs of the wire industry and in suggesting the exactly right



Round, square, hex or specials—in carbide or steel as drawing requirements may indicate.

steel or carbide for specific applications. Because they know and sell both, you can depend on their unbiased recommendations to result in better, more economical tooling.

P-4

Firth Sterling

—INC—

GENERAL OFFICES: 3113 FORBES ST., PITTSBURGH 30, PA.

OFFICES* AND WAREHOUSES: BIRMINGHAM* CHICAGO CLEVELAND DAYTON* DETROIT HARTFORD HOUSTON* LOS ANGELES NEW YORK* PHILADELPHIA* PITTSBURGH* WASHINGTON* WESTFIELD, N.J.*

PRODUCTS OF FIRTH STERLING METALLURGY

High Speed Steels
Tool & Die Steels
Stainless Specialties
High Temperature Alloys
Sintered Tungsten Carbides
Firth Heavy Metal
Chromium Carbides
High Temperature Cermets

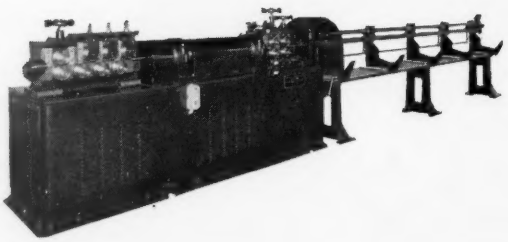
THE BIG NEWS IN WIRE STRAIGHTENING IS THE NEW

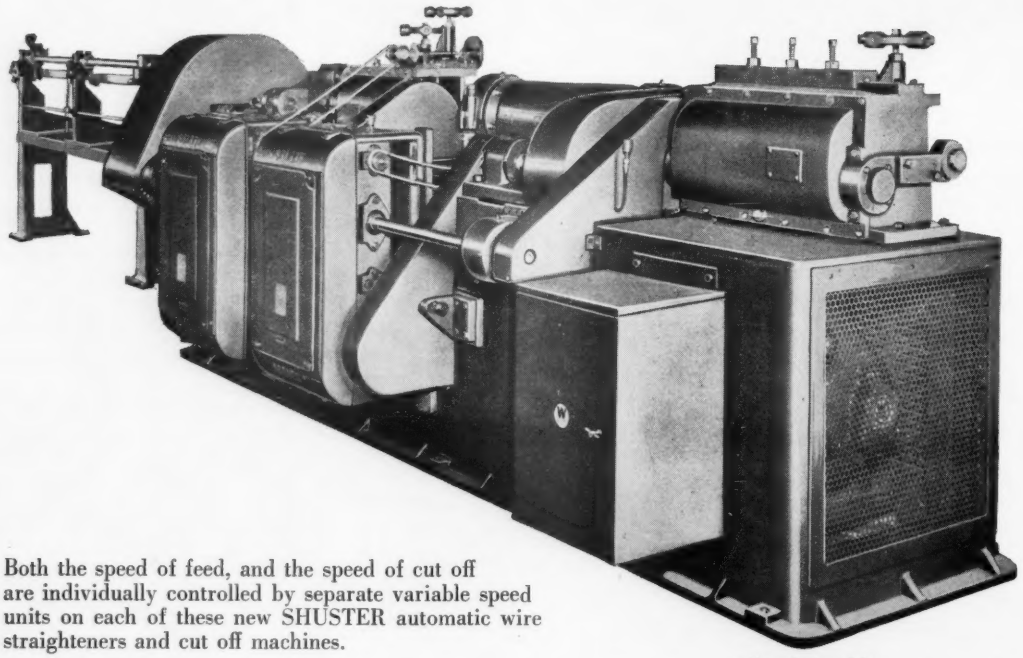
SHUSTER *Since 1866*

Dual Control

3AV & 4AV

with **INFINITE SPEEDS**





Both the speed of feed, and the speed of cut off are individually controlled by separate variable speed units on each of these new SHUSTER automatic wire straighteners and cut off machines.

No. 3AV handles wire 1/2″ dia. max.; 4AV will take 11/16″ max.

Of all SHUSTER machines built since 1866, we feel these are the best yet. Write for Bulletin 37V and get the complete story.

Manufactured by

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SHUSTER *Since 1866*

Automatic **WIRE STRAIGHTENING AND CUTTING MACHINES**

ELGIN DIAMOND

meets rigid quality standards

at Allegheny Ludlum Steel Corporation, Pittsburgh

When wire is pulled through carbide dies, tremendous heat and pressure are generated. That is why the working surfaces of wire drawing dies must be polished to a near perfect finish. That is why Allegheny Ludlum uses Elgin Diamond.

Elgin Diamond assures the finest possible finish—and in less time—because all Elgin Diamond is precision graded and permanently suspended in a color-identified compound right in the Elgin laboratories. There are no oversize particles to scratch, no "fines" to decrease cutting efficiency.

Hundreds of die finishing applications prove Elgin Diamond reduces costs and produces a better finish every time . . . in less time! Now is the time to try Elgin Diamond and prove it to yourself!

Ask for a free demonstration!

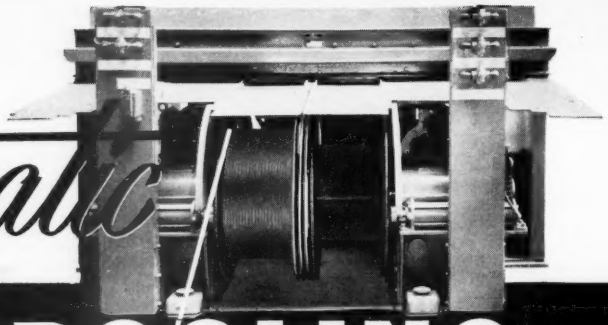
ABRASIVES DIVISION

ELGIN NATIONAL WATCH COMPANY

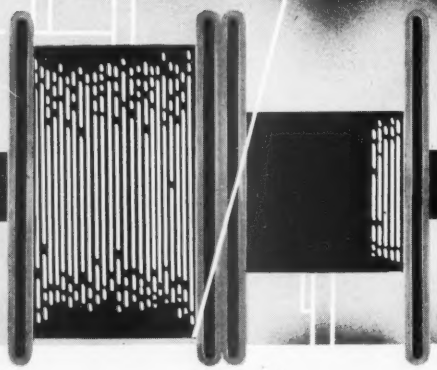
Dept. G

ELGIN, ILLINOIS

Continuumatic SPOOLING...

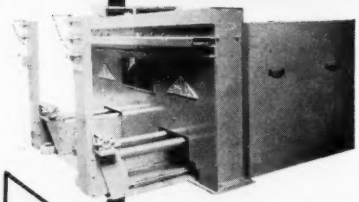


NO SHUTDOWNS NO SLOWDOWNS

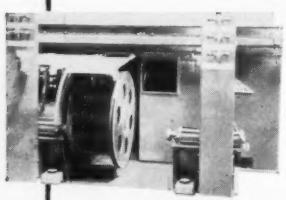


for...ALUMINUM and COPPER wire

Absolutely no shutdowns or slowdowns at operating speeds for EC ALUMINUM and COPPER wire drawing machines . . . and adaptable to your existing equipment — either Syncro or others. Handles standard reels up to 30" diameter maximum and for either hard or soft EC aluminum or copper wire in a range of sizes from ⅛" and finer. Its exceptionally fine adaptability to aluminum and copper drawing is at present of widespread interest to the wire industry. Are you "in the know" concerning this pioneered and better developed Syncro spooling improvement? We believe, without question, it is the best on the world's market. Feel free to call on us without obligation to explain to you how its many practical applications can reduce costs and increase profits!



Directly above: view shown during operation.



Wound spool ready to be replaced with empty spool. Another spool inside is still spooling without stop.

- successive starting shock loads eliminated!
- pre-determined package weights assured!
- maximum speed and spool capacity!
- no spool change-over shutdowns!
- PROVED superiority!
- safer!

FURTHER DETAILS OF THIS ADVANCED IMPROVEMENT AVAILABLE ON REQUEST

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MACHINE COMPANY

PERTH AMBOY • NEW JERSEY • U.S.A.

Machinery for the Wire Industry AFFILIATED COMPANY: WINGET-SYNCRO, ROCHESTER, KENT, ENGLAND

WIRE AND WIRE PRODUCTS*

Reg. U. S. Pat. Off.

A monthly publication devoted to the production of Wire, Rod and Strip, Wire and Rod Products and Insulated Wire and Cable.

DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 29 JANUARY, 1954 No. 1

Designated as Official Publication By The Wire Association

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WIRE and WIRE PRODUCTS is indexed regularly by Engineering Index, Inc., New York, N. Y.

RICHARD E. BROWN, President and Publisher

R. S. Spengel, Secy.-Treas. & Gen'l. Manager
J. Edward Donnellan, Vice-President

Edmund D. Sickels, Editor

— ASSOCIATE EDITORS —
Lancaster, Allwine & Rommel, Consultants on Patent Information

Publication Office: Jersey City, N. J.
Executive Office: 453 Main St., Stamford, Conn.
*Reg. U. S. Pat. Off.

WIRE & WIRE PRODUCTS, Vol. 29, No. 1, January, 1954. Publication Office at One Sherman Avenue, Jersey City, N. J. Executive Office 453 Main Street, Stamford, Conn. Published monthly by the Quinn-Brown Publishing Corp., Richard E. Brown, President; R. S. Spengel, Sec'y and Treas. Subscription Price: U .S. $8.00; Canada, $8.00 per year; Domestic 75 cents per copy; Foreign 90 cents per copy, except October Convention Issue and January Proceedings Issue, $1.25 per copy; Foreign $10.50 per year. Entered as second class matter at the Post Office, Jersey City, N. J. under the act of March 3, 1879.

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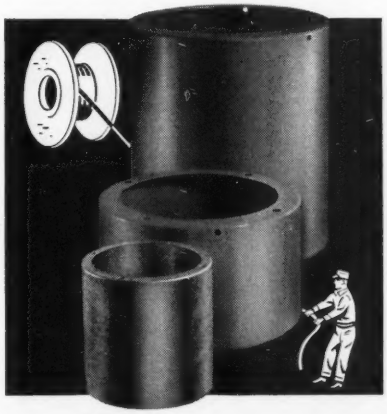
FLANGED STEEL TRAVERSES



are:

1. Light in weight
2. Durable
3. Strong
4. Easy to assemble
5. Smooth—free from rough spots that might damage plastic-covered cable.

Made in sizes up to 56-inch diameter and 48-inch traverse—in plain, painted or hot dip galvanized finish—as light as 18-gauge steel. Width of flange and number of bolt and drain holes furnished to your specifications. Available for prompt delivery. Write for prices.

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PRESSED STEEL DIVISION
REPUBLIC STEEL CORPORATION
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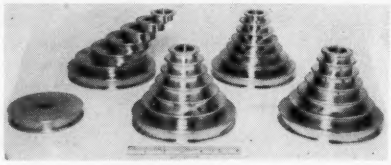
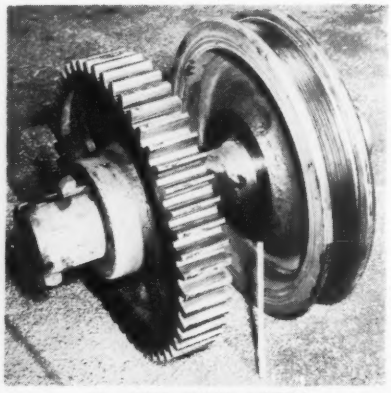
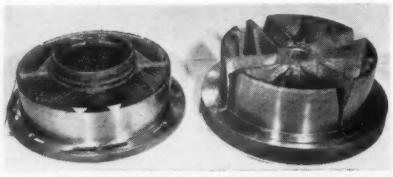
(2) VAUGHN 20" BLOCKS



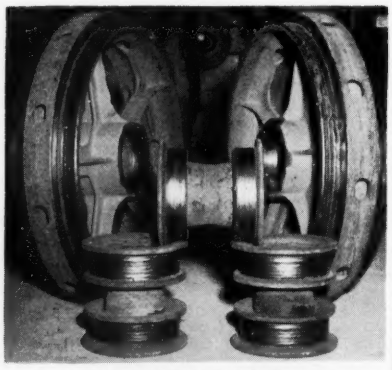
(3) SYNCRO A-16 DRAW RINGS



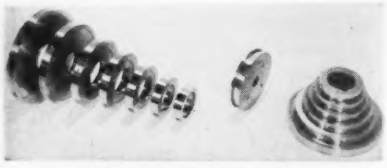
(4) STEEL CRANE WHEELS



(5) MORGAN-CONNOR 22" BLOCK

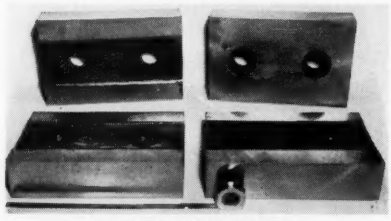


(6) ROLLERS & IDLERS



(7) SYNCRO VTW-14 DRAW RINGS

(8) VAUGHN 30" BLOCKS



(9) HOT SHEAR BLADES

PK HARDSURFACING PAYS

Parts last 3 to 10 times longer than standard equipment

— Saves down-time — Cuts wire rejections

— Increases production —

(1)	Our new home	:				
(2)	Hardsurfaced Vaughn 20" blocks	:	10-1	min.	Oven	std. equip.
(3)	Syncro A-16 hardsurfaced draw rings	:	5-1	min.	"	" "
(4)	24" Dia. Tool Steel hardsurfaced crane wheels	:	3-1	min.	"	" "
(5)	Morgan-Connor 22" Stripper blocks	:	10-1	min.	"	" "
(6)	HD-19 Hardsurfaced Rollers & Idlers	:	3-1	min.	"	" "
(7)	Syncro VTW-14 hardsurfaced draw rings	:	5-1	min.	"	" "
(8)	Hardsurfaced Vaughn 30" blocks	:	7-1	min.	"	" "
(9)	Hardsurfaced hot shear blades	:	4-1	min.	"	" "

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CHASE WIRE can help keep your production costs down

You cut down rejects when you use Chase Brass and Copper Alloy Wire.

Chase mills inspect every coil of wire produced. No scratches, no slivers, spills, or laps! Chase wire is of uniform temper and grain size, uniform in surface texture and color, accurate in gauge. It comes to you clean and bright.

Chase wire is available in a wide variety of alloys, shapes, sizes and tempers.

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the problem: ***how to produce* BUNCHED WIRE *with the smooth concentric qualities of stranded wire in a limited floor area?***

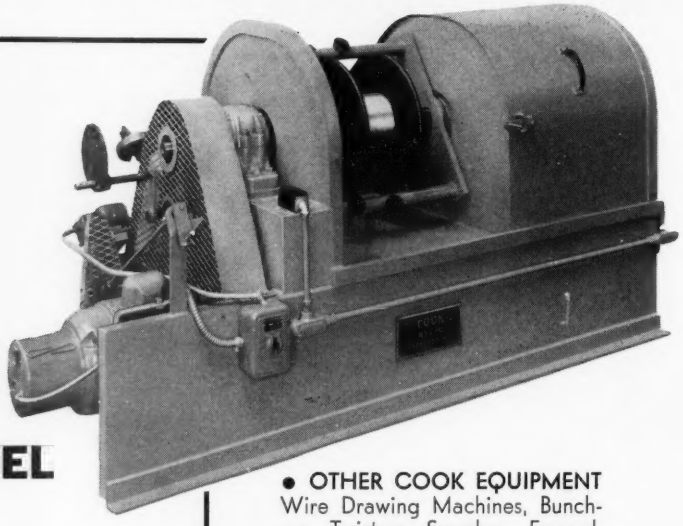
the solution: ***install a* COOK BUNCHER *with these features:***

HIGH SPEED

SINGLE TWIST FLYER

AUTOMATIC LAY CONTROL

LARGE TAKE-UP REEL



- *See Specification Chart below for the COOK BUNCHER most suited to your requirements.*

- **OTHER COOK EQUIPMENT** Wire Drawing Machines, Bunchers, Twisters, Spoolers, Enameling Machines, Tinning Pots, Wrapping Machines, Cabling Machines, Enameling Take-Ups and Pay-Offs, Tinning Take-Ups and Pay-Offs, Wire String-Up Machines and Special Machinery

COOK MANUFACTURING COMPANY has a complete line of BUNCHING EQUIPMENT to accommodate the following reel sizes.

Model	Size	Capacity
B-H-8	8" x 6"	40 lbs.
B-H-12	12" x 8½"	100 lbs.
B-H-16	16" x 8½"	200 lbs.
B-H-21	21" x 8½"	350 lbs.
B-H-22	22" x 11"	500 lbs.
B-H-24	24" x 11"	700 lbs.

ALL COOK BUNCHERS have successfully formed bunched strands of 7, 10, 16, 19, 26, 41 and 65 wires with such concentricity as to enable its passage through an extruding die of only 1 mil clearance. In addition, such constructions as 27/36 and 41/36 have been bunched at high speed with perfect concentricity on these versatile machines.

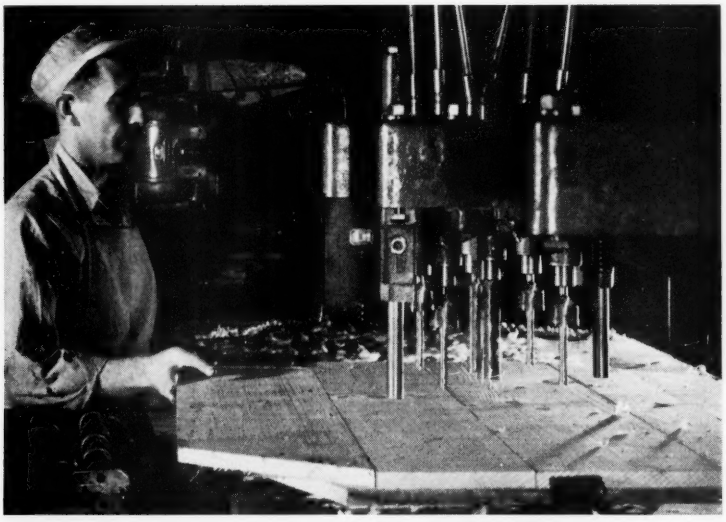
•

Write today for descriptive literature giving details of construction and performance.

COOK MANUFACTURING COMPANY

50 East 25th Street, Paterson, N. J. Telephone: ARmory 4-6380 or 6381

Your Reel Specifications Are BRIDGE'S Blue Print



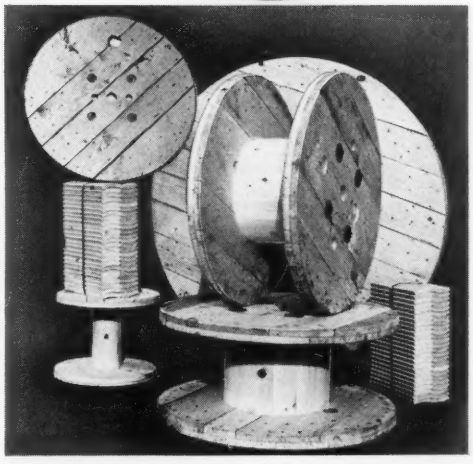
Above: **BORING MACHINE**

WOOD REELS for **CABLE, ROPE** and **WIRE**

ALL SIZES AND TYPES OF SHIPPING AND SHOP REELS

12" to 96" in diameter. Knocked down or assembled. Returnable or non-returnable. Wood heads for steel drums.

REELS made by **BRIDGE** are of precision construction produced for each customer to his own specifications. They are rugged and will withstand severe handling, yet they cost you no more than ordinary reels. Our modern plant, with much equipment specially built for us, together with our straight-line production methods, assure you of the best at the lowest cost.



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MANUFACTURING CO.
HAZARDVILLE, CONN.

FOR BONDING STRANDED WIRE and LOCALIZED ANNEALING of SPRING WIRE

Lepel

LOW COST—PORTABLE HIGH FREQUENCY *Induction* HEATING UNIT

This newly developed tube operated high frequency generator is ideal for bonding together the ends of the individual strands of multi-strand wire and cable, thus eliminating the necessity of tin-dipping the ends of the wire after cutting and stripping.

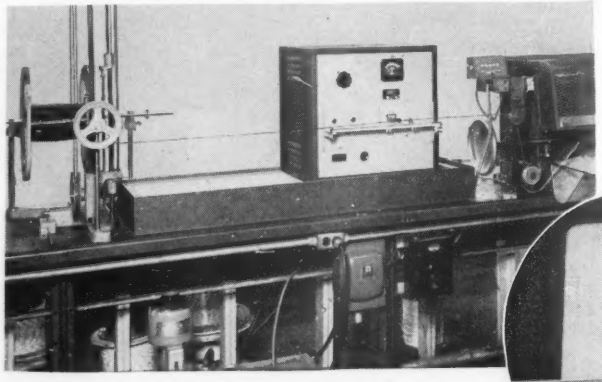
This highly versatile unit can be used in conjunction with an automatic wire cutting and stripping machine. When used in this manner, the wire is fed continuously through the load coil of the generator and the heating cycle is synchronized with the stroke of the wire cutter. The wire is heated and bonded at successive points where the subsequent cutting and stripping operations occur. The same set-up may be used for localized annealing of spring wire except for the use of a spring winding machine instead of the wire cutter and stripper.

The Lepel Model T-1-W is also ideally suited for heat treating thin parts such as surgical needles and dental burrs, and joining various types of wire products.

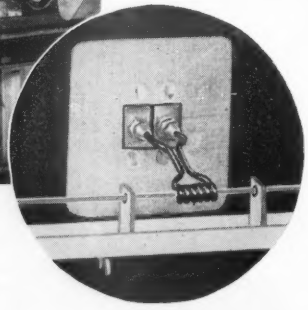
MODEL T-1-W

$885.

F. O. B. FACTORY



Set-up for automatic bonding, stripping and cutting in the wire department of the Federal Telephone and Radio Corp.



Enlarged view of the coil arrangement with the insulated wire passing continuously through the heating coil.

SPECIFICATIONS AND FEATURES

The power input is 1.6 KVA at 115 volts, 60 (or 50) cycles, single phase.
A stepless Thyratron Control is incorporated to adjust output power for heating various thicknesses of wire and other parts.
The water consumption is negligible, requiring but a fraction of a gallon per minute. Ordinary tap water pressure is sufficient.
As a precautionary measure, a magnetic trip circuit breaker protects the generator from overloading.
This unit can be operated by a footswitch or with an automatic timer.
Dimensions: 21" wide, 18" high, 15" deep. Weight: 150 pounds.

All Lepel equipment is certified to comply with the requirements of the Federal Communications Commission.

LEPEL HIGH FREQUENCY LABORATORIES, INC.
55th STREET and 37th AVENUE, WOODSIDE 77, NEW YORK CITY, N. Y.

STEEL TRAVERSES

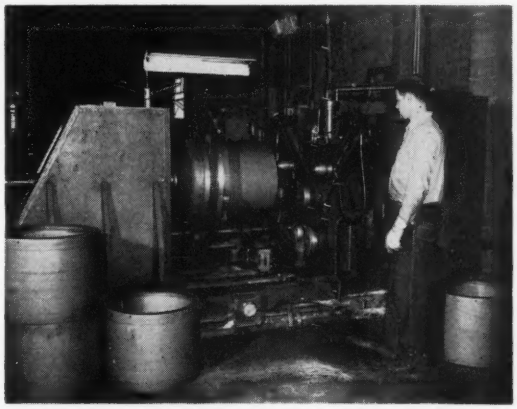
FLANGED STEEL DRUMS FOR REELS
for
WIRE ✦ CABLE ✦ WIRE ROPE

Plain finish . . .

Painted finish, or . . .

Galvanized finish (Hot dipped)

- **For use with nailed, plywood, metal bound and cast flanges. Made from a single sheet of metal—rolled—welded—flanged, with bolt holes punched to your specifications.**



SAVES COST in assembly of reel by eliminating handling of larger number of small parts.

SAVES COST by making repairs easy.

SAVES COST by increasing reel life.

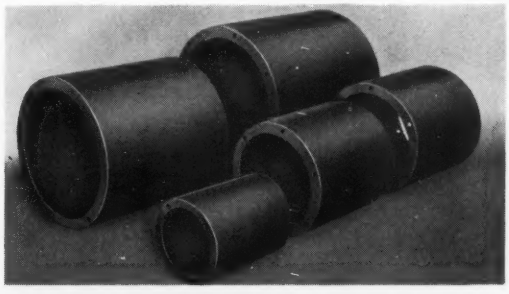
SAVES COST by reducing damage to wire and cable.

LATEST SEMI-AUTOMATIC FLANGING EQUIPMENT AND NEW GALVANIZING PROCEDURE MAKE POSSIBLE LOWEST UNIT COST.

Furnished in steel and aluminum—with flanged or plain ends.

Reinforced construction for heavy duty operations.

- **HUBBARD MAKES A COMPLETE LINE OF ALL STYLES OF FLANGES FOR USE WITH STEEL TRAVERSES.**



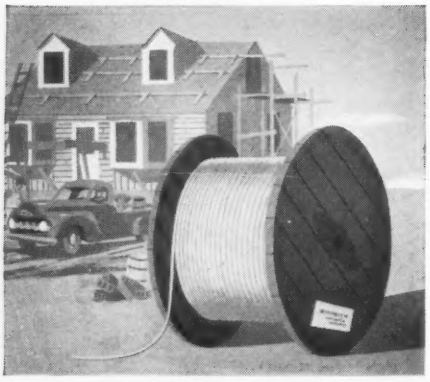
HUBBARD SPOOL COMPANY

GARRETT (Tel.: Garrett 840) INDIANA

"THE BIGGEST NAME IN SPOOLS AND REELS"

Electrical wire and cable coatings

call for CELLUFLEX* 179C



- **FLAME RESISTANT**
- **HIGH DIELECTRIC STRENGTH**
- **LOW WATER AND OIL EXTRACTION**
- **RAPID FUSION**

DESCRIPTIVE DATA

CELANESE* PLASTICIZER	GRADE	APPEARANCE	COLOR APHA Max.	SPECIFIC GRAVITY @ 20/20°C.	ACIDITY	ESTER VALUE % Min.	PERMANGANATE TIME, Min. (in Minutes)	REFRACTIVE INDEX @ n $\frac{25°C.}{D}$
LINDOL* tricresyl phosphate coal tar base	Technical	Clear transparent liquid	75	1.165 ± .005	0.01 (3)	99	30	1.553
CELLUFLEX* 112 a mixed ester	Technical	Clear transparent liquid	40	1.210 ± .005	0.01 (3)	99	30	1.560
CELLUFLEX* 179C tricresyl phosphate petroleum base	Technical	Clear transparent liquid	150	1.165 ± .005	0.01 (3)	99	30	1.553
CELLUFLEX* TPP triphenyl phosphate	Technical	White flakes	20 (4)	1.202 ± .005 (1)	0.003 (3)	99	30	1.550 (1)
CELLUFLEX* DBP dibutyl phthalate	Technical	Clear transparent liquid	50	1.045 ± .001	0.01 (2)	98	—	1.490
CELLUFLEX* DOP dioctyl phthalate	Technical	Clear transparent liquid	50	0.986 ± .002	0.01 (2)	98	—	1.485

(1) @ 60° C. (2) % as phthalic, max. (3) % as phosphoric, max. (4) molten

Celluflex* 179C—tricresyl phosphate, commercially developed by Celanese — is the standard of comparison among flame-resistant plasticizers for electrical applications. It has very low volatility, excellent solvent power, a high degree of permanence ...producing tough flexible vinyl coatings for transformer wires and electrical cable.

Celanese, pioneer in the production of petroleum-based and coal tar-based tricresyl phosphate plasticizers, today offers an expanding list of Celluflex plasticizers designed to fit a broad range of applications. Celanese Technical Service and Applications Laboratories is fully equipped to assist you in formulations and tests. Bulk stocks of Celanese Plasticizers are maintained at centrally located distribution points for prompt delivery. Many wire manufacturers are taking advantage of minimum prices by ordering combination shipments of Celanese* Solvents, Plasticizers and Intermediates, in compartmented tankcars, tankwagons, or mixed drum carloads.

Celanese* CHEMICALS

Celanese Corporation of America
Chemical Division, Dept. 590-A
180 Madison Avenue, New York 16, N.Y.

*Reg. U. S. Pat. Off.

Aiming for Better Production?

J&L SCRAPLESS NUT WIRE CAN'T BE BEAT

Scrapless nut production is a tough business. It takes the best in know-how, the best in equipment and the best in wire.

You supply the production know-how and equipment and J&L will supply scrapless nut wire that's *right*.

When we say *right*, we mean scrapless nut wire that has the—

SURFACE QUALITIES
WORKABILITY
UNIFORMITY
FINISH

. . . to increase die life, reduce down time and boost your over-all production of a better finished product.

J&L Steel wire is quality controlled from the mine through the finished product. J&L has the modern equipment to produce a really uniform high-quality product. J&L has the steel-making experience to provide a dependable source of supply.

The result—you'll find that J&L scrapless nut wire can't be beat. Why not investigate its economies now? Contact the J&L representative nearest you or write: Wire Products Department, Jones & Laughlin Steel Corporation, 401 Liberty Avenue, Pittsburgh 30, Pa.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH

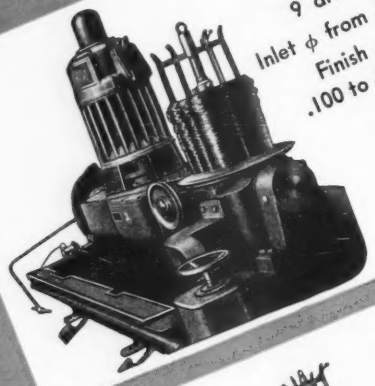
J&L STEEL

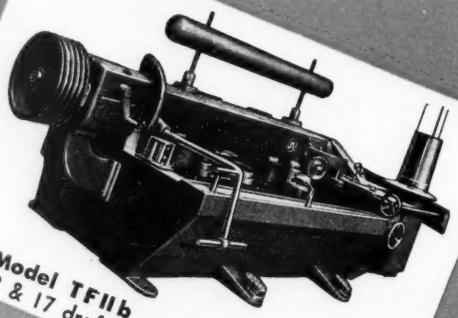
HERBORN

Wire Drawing Machines for Copper and Non-Ferrous Metals

by the submerged system

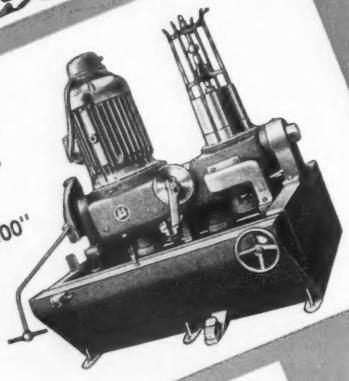
Model TF I
9 drafts
Inlet ϕ from .250"
Finish ϕ
.100 to .054"

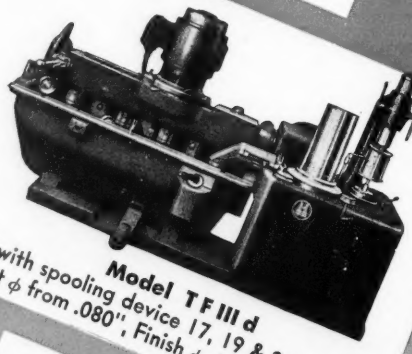




Model TF IIb
13 & 17 drafts Inlet ϕ from .120"
Finish ϕ .050 to .140"

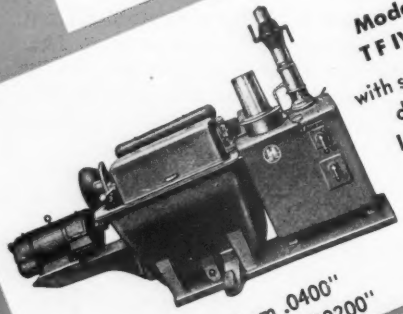
Model TF II d
9 & 11 drafts
Inlet ϕ .120"
Finish ϕ
.065 to .0300"





Model TF III d
with spooling device 17, 19 & 21 drafts
Inlet ϕ from .080", Finish ϕ .0140" to .00400"

Model TF IV b
with spooling device
19 drafts



Inlet ϕ from .0400"
Finish ϕ .00800" to .00200"

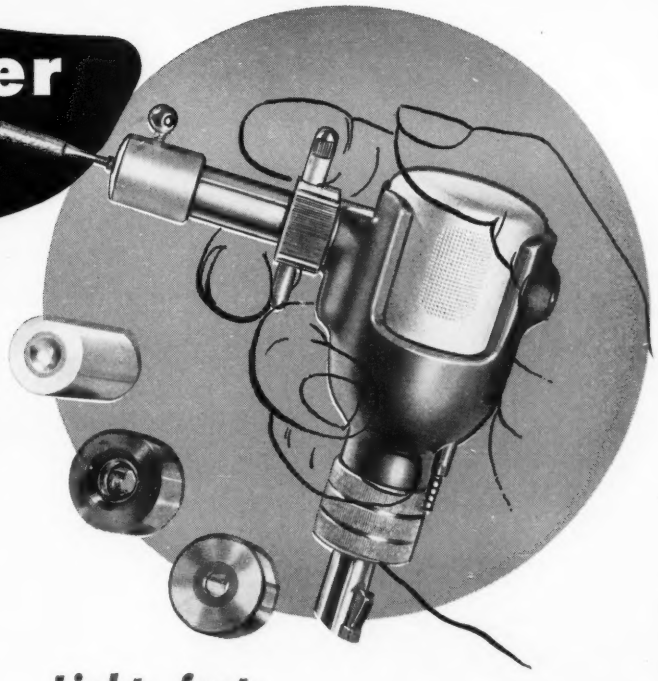
Model TF VI
with spooling device
13 drafts
Inlet ϕ from .00400"
Finish ϕ .00240" to .00120"

Our Machines are covered by Patents

MASCHINENFABRIK HERBORN

BERKENHOFF & DREBES A.-G. HERBORN/DILLKREIS

The Di-Profiler
(U.S. Pat. Pend.)
Reciprocating Hand Machine



Saves Costly Hours On Dies and Molds

Faster, and far superior to manual techniques, the Di-Profiler is indispensable for cutting, lapping and polishing operations involving flat or curved surfaces on regular or irregular drawing dies.

Complicated and intricate dies and molds are finished in a fraction of normal time by using this efficient and precise machine with standard Di-Profiler diamond and tungsten-carbide tools.

In die and mold shops throughout the country, the Di-Profiler has paid for itself many times over through labor-saving cost reductions.

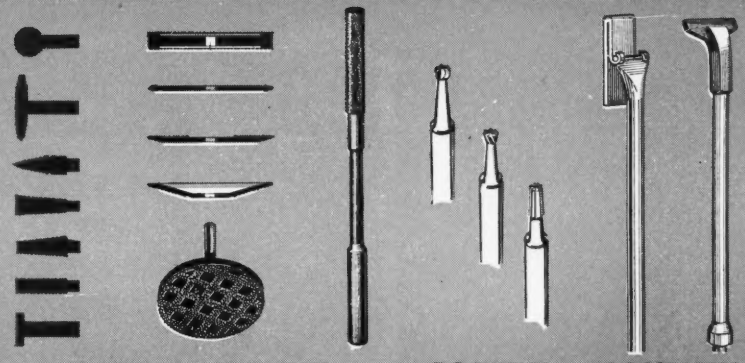
The low price permits placing the Di-Profiler in the hand of every operator in your shop.

Light, fast, variable speed and stroke

The Di-Profiler is rapid, precise, easy to operate—simple and sturdy in construction. Its weight of less than one pound and freedom from vibration eliminate fatigue and assure perfect control during operation.

The Di-Profiler has an adaptable stroke variable from 0 to 6mm (¼"), and a speed of reciprocation that can be varied from 0 to 100 strokes per second—a versatility that proves useful for every type of job.

Complete Stocks of T-C Cutters; Diamond Files, Disks, Points, Burrs, Scrapers



DIAMOND TOOLS AND FILES | T-C CUTTERS | T-C SCRAPERS

Immediate service on parts, replacements, repairs

Write for free demonstration in your shop...or new technical folder No. DW153

ENGIS EQUIPMENT CO.

431 South Dearborn Street • Chicago 5, Illinois

Exclusive Distributors for the United States

DRAW IT fast ...DRAW IT cool

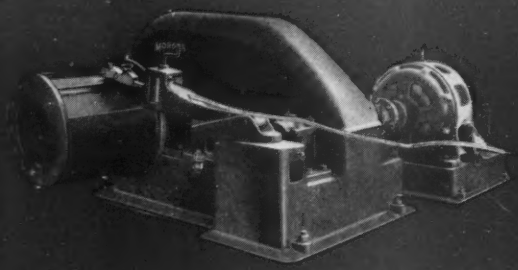
ORGAN-CONNOR WIRE MACHINES
MORGAN
WORCESTER

To draw rope wire at high speed and maintain necessary physical properties wire temperatures must be reduced rapidly.

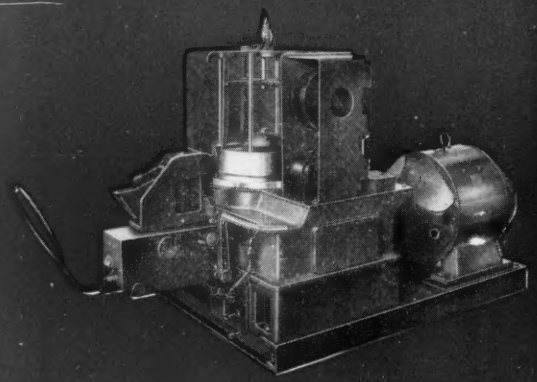
Recent scientific tests prove the remarkable efficiency of the Morgan-Connor air cooling system. For example, drawing .090" rope wire at 1200 FPM finishing at 255,000 psi tensile, the average temperature of the wire leaving the dies was 380°F.

Eleven seconds after leaving the dies, the average temperature of the wire was 200°F.

Will your machines do that?

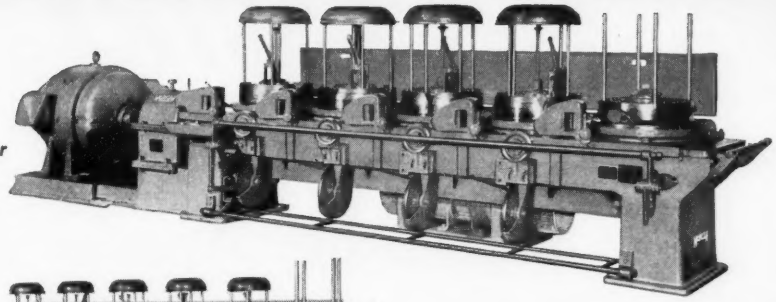


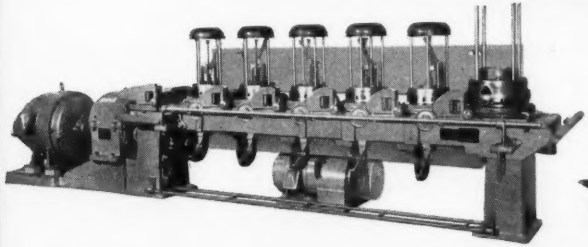
Morgan Horizontal Bull Block



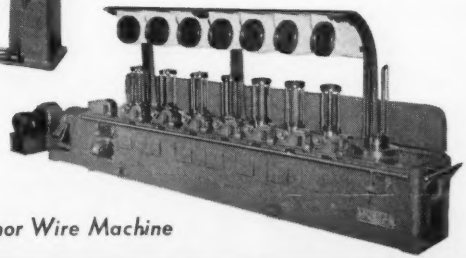
The Morgan Wire Block

Type B
Morgan-Connor
Wire Machine





Type C
Morgan-Connor Wire Machine



Type F
Morgan-Connor Wire Machine

MORGAN
WORCESTER

ROLLING MILLS · MORGOIL BEARINGS
WIRE MILLS - GAS PRODUCERS - AIR EJECTORS
REGENERATIVE FURNACE CONTROL

Morgan Construction Co. Worcester, Mass.

FINE WIRE . . .

FOR FINE PRODUCT DETAILS

CONTINENTAL STEEL CORP. KOKOMO, IND. STEEL CONTINENTAL WIRE REG. U.S. PAT. OFF.

ROUND and SHAPED WIRE

. . . For Rugged Use and Product Sales Appeal

Our wire people spend much of their time solving problems for folks who use wire in their operations. Continental is geared to produce a great range of wire shapes and sizes. Whether yours is a product-trim problem . . . or a basic or component part need—Continental may have just the wire you want. And one thing is sure . . . you will like the service, interest and the production follow-through you'll get at Continental. Just write or phone us today at Kokomo. You'll be glad you talked with Continental.

*Trade Mark Reg. U. S. Pat. Off.

Standard and Special Wire Shapes

FLAT	KEYSTONE-SHAPED
HALF ROUND	STAR-SHAPED
ROUND	HEXAGONAL
OVAL	GROOVED FLAT WIRE
HALF OVAL	SPECIAL WIRE
SQUARE	TRIM DESIGNS
RECTANGULAR	BREAD-SHAPED
TRIANGULAR	D-SHAPED

CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

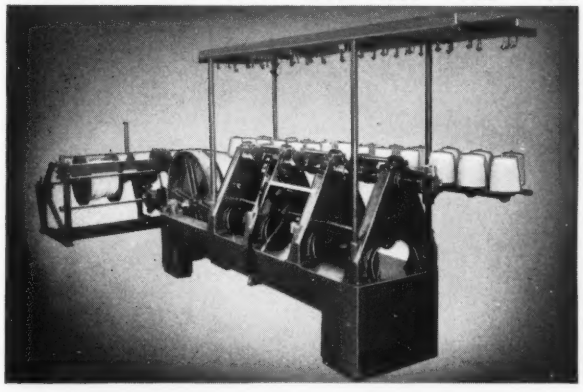
PRODUCERS OF *Manufacturer's Wire* in many sizes, shapes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

More and more, leading wire manufacturers the world over are proving the advantages of the *Fidelity Sinfra Knitter.**

With each new installation the *Sinfra* establishes —time after time—its ability to cover wire faster and more economically than any other method.

Today, the list of *Sinfra* users includes the world's foremost manufacturers of Wire and Cable.

Why not prove for yourself the outstanding advantages of this amazing machine? Write today for Catalog W or visit the new show rooms at our plant.



*Approved by Underwriters' Laboratories, Inc., American Standards Association, Association of American Railroads, Canadian Standards Association, and Federal Specification J-C-145.

Designers and Builders of Intricate, Automatic Precision Machines

SINCE 1911

FIDELITY MACHINE COMPANY, INC.

3908 - 18 FRANKFORD AVENUE, PHILADELPHIA 24, PA.

Export Dept.:
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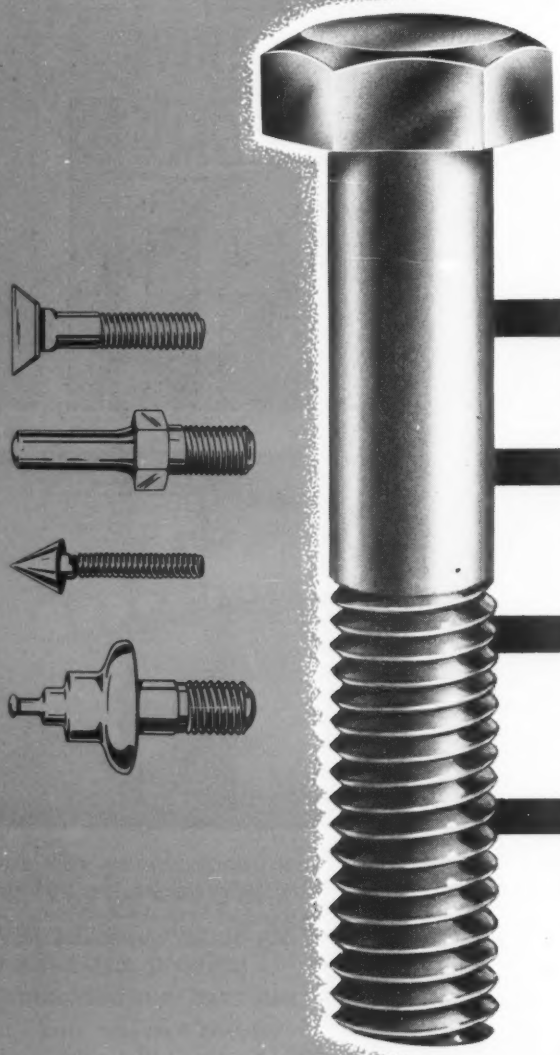
Canadian Representative:
The Larson Co., Toronto, Ontario, Canada.

Steelskin RESEARCH Announces a NEW series of CE* Lubricants!



Proven by 2 years of production use in several mills, this *completely new* approach to cold-heading lubrication is now introduced to the cold extrusion industry. If you have been using aluminum stearate-lime mixtures in your cold-heading operations, you will want to try STEELSKIN CE* on your job for several reasons:

UNIFORMITY OF PRODUCT

STEELSKIN CE* cannot become segregated or separated. It is a chemically homogeneous product made by an *exclusive* STEELSKIN process.

PHYSICAL CHARACTERISTICS

STEELSKIN CE* has the same free-flowing granular properties of other STEELSKIN dry powders. The dense powder rolls freely in the die box, but it *does not run out* like fluffy mechanical mixtures.

LUBRICATION PROPERTIES

A non-separable product, STEELSKIN CE* retains its uniform chemical composition during shipment and *in the die box*. Therefore, you get a uniform finish. And no matter what kind of a cold-heading job you have, one of the STEELSKIN CE* series can be depended upon to do the job.

COST INFORMATION

A custom-made product like STEELSKIN CE* usually commands a premium price. STEELSKIN CE* *actually costs less* than conventional mechanical mixtures. In addition, you have no mixing problems and you are guaranteed the same uniform product every time.

***COLD EXTRUSION**

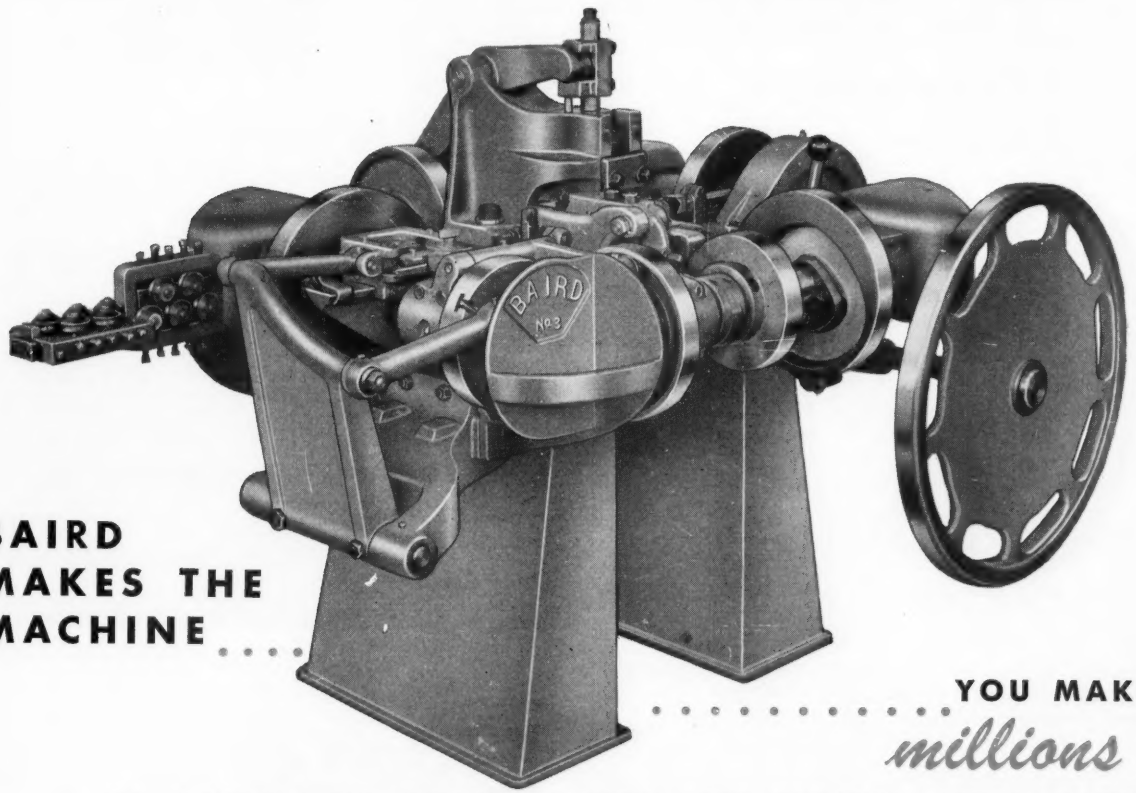
R. H. MILLER
Company, Inc., Homer 1, N. Y.

Steelskin LUBRICANTS

"STEELSKIN" – FIRST IN LUBRICATION—FIRST IN SERVICE

ASK BAIRD ABOUT IT!

HIGH PRODUCTION TOOLING



BAIRD MAKES THE MACHINE . . . .

. . . . . YOU MAKE *millions*

. . . OF ACCURATELY FORMED WIRE AND RIBBON METAL PARTS

The Baird automatic Four-Slide Machine produces an extremely wide variety of articles made of any commercial wire . . . round, half-round, square, or flat . . . at highest speeds. It takes coiled wire from a reel, straightens, feeds, and cuts off the required length . . . then forms and ejects the part produced. Eight sizes handle shorter wire lengths; three sizes take longer lengths to 32½".

By means of special attachments, the versatility of the machine is further extended to include the making of round wire and ribbon metal rings, secondary cut-offs, lettering, and other operations.

The detailed and complete story, with specifications, is told in our new Four-Slide Bulletin. If you require hundreds of thousands or millions of wire units to ½" dia., or flat ribbon metal products to 1½" wide . . . this is your profit-making machine. Send for bulletin.

3BA53

the **BAIRD MACHINE COMPANY**
STRATFORD • CONNECTICUT

AUTOMATIC MACHINE TOOLS • AUTOMATIC WIRE & RIBBON METAL FORMING MACHINES • AUTOMATIC PRESSES • TUMBLING BARRELS

Fastest Process Annealing FOR COILED STEEL WIRE

- ✓ Annealing cycles accomplished in minutes rather than in hours
- ✓ 50% lower equipment cost
- ✓ less floor space
- ✓ no scale, decarburization, or other atmosphere effects

On-the-job production figures prove that no other method compares with an Ajax Electric Salt Bath Furnace in speed, uniformity, cost saving, and general all-around efficiency in process annealing all types of steel wire as well as aluminum, copper alloys, and silver alloys.

Heating cycles are far faster. Absolute uniformity is assured. Thanks to the exclusive Ajax electrodynamic stirring action, the temperature does not vary more than ±5°F. *in any part of the bath.*

The Ajax Salt Bath eliminates all atmosphere with its accompanying problems of oxidation, pitting, and decarburization. Preservation of metal surface is assured. Equipment cost is much lower —and the Ajax handles more work for a given amount of floor space than any other method. Ajax Reprints 62 and 63 gladly sent on request.

LOW- AND HIGH-CARBON STEELS

This typical Ajax installation process anneals 1200 lb. 18-gauge wire an hour in only 58 feet of floor space.

STAINLESS STEEL

Annealing fine gauge nickel-chromium wire at 1950°F. Clean wire surface eliminates conventional pickling operations.

- **TOPS for WIRE PATENTING, too!**
- **IDEAL FOR DESCALING** hot-rolled stainless and alloy steel wire and other shapes employing either the Dupont sodium hydride or the Hooker Electrochemical Virgo bath.

Associate companies: Ajax Electric Furnace Corp. • Ajax Engineering Corp. • Ajax Electrothermic Corp.

AJAX electric SALT BATH furnaces

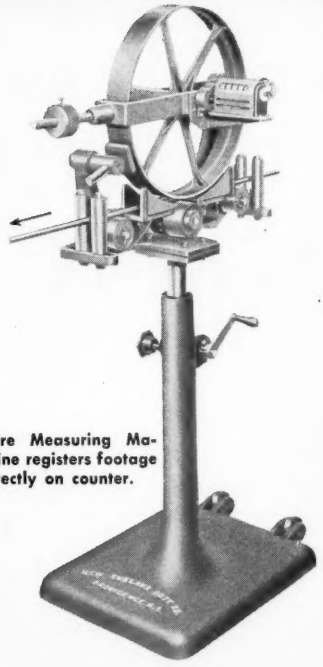
OVER 4,000 INSTALLATIONS . . . more than all other salt baths combined

AJAX ELECTRIC CO., Inc., 928 Frankford Ave., Philadelphia 23, Pa.

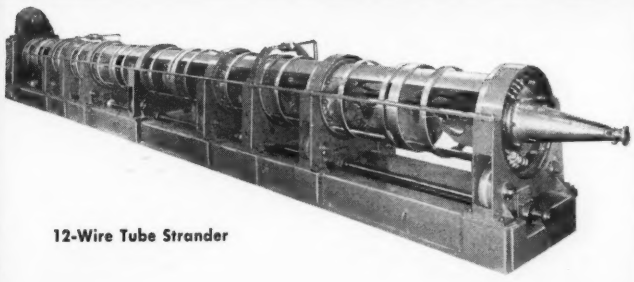
MACHINERY...

For More Production and Better Profits

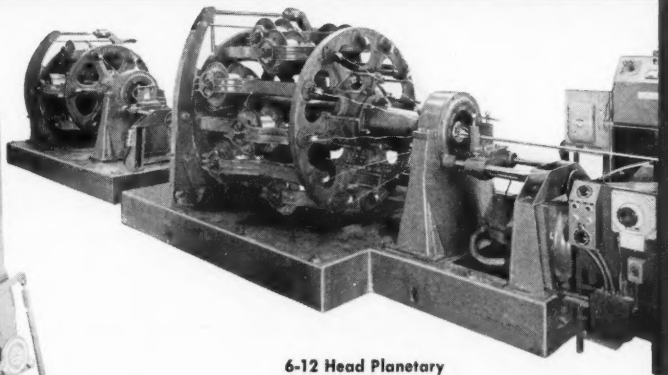
Engineered and built for dependable, high speed production, Nebuttco Equipment is the last word in wire making machinery. If you produce cables or strands, bare or insulated, we can help you improve your products and your profits. Ask for information and literature. New England Butt Company, 304 Pearl St., Providence 7, R. I. James Day (Machinery) Ltd., 28 Maddox St., London W1, England.



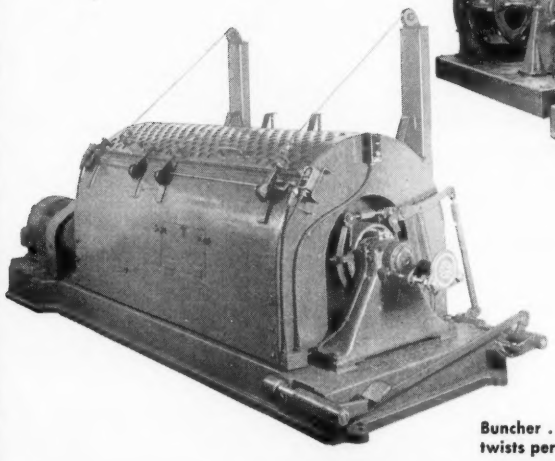
Wire Measuring Machine registers footage directly on counter.



12-Wire Tube Strander



6-12 Head Planetary Cabling Machine



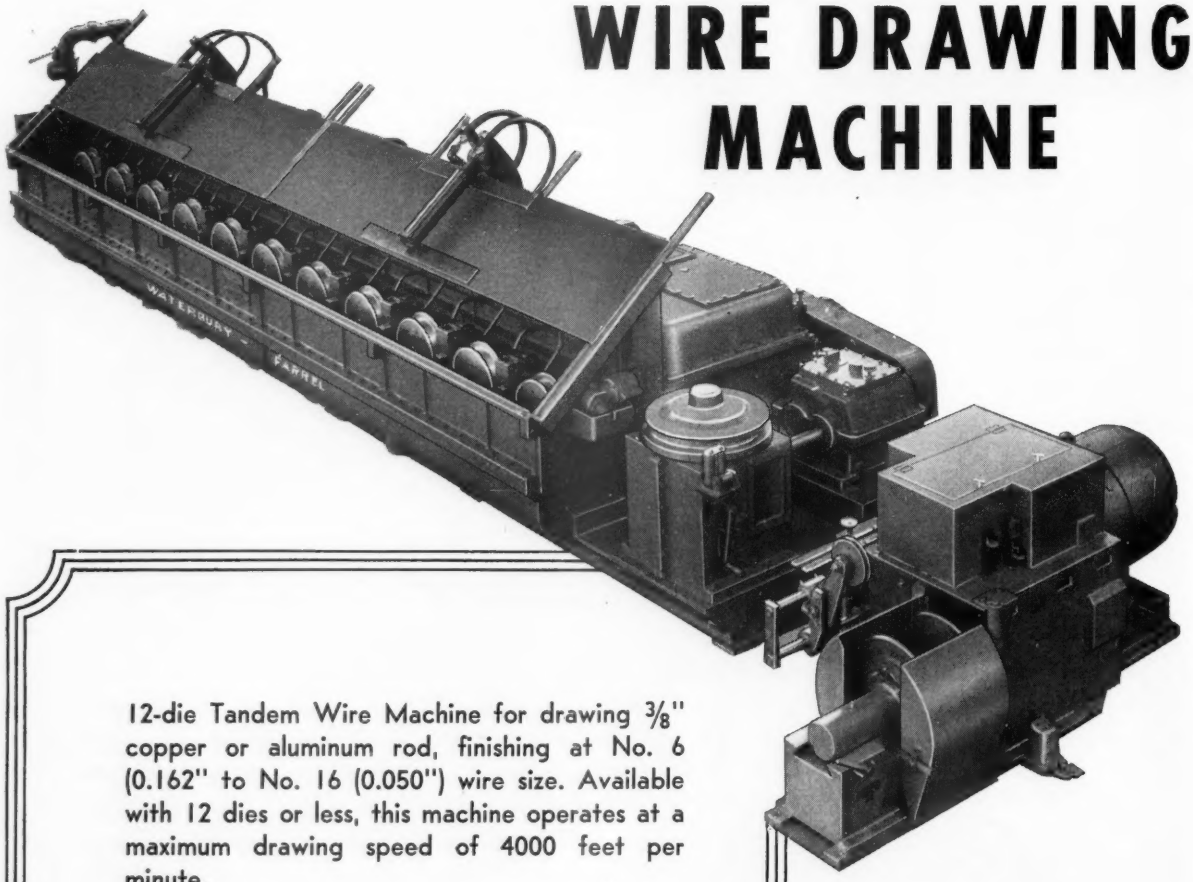
Buncher . . . 1,000 R.P.M., 2,000 twists per min., 500 lb. spool

NEBUTTCO

BRAIDERS • CABLERS • TAKE UPS
BUNCHERS • STRANDERS • TAPING MACHINES

4000 FEET PER MINUTE

WITH THIS WATERBURY-FARREL 12-DIE TANDEM WIRE DRAWING MACHINE



12-die Tandem Wire Machine for drawing 3/8" copper or aluminum rod, finishing at No. 6 (0.162" to No. 16 (0.050") wire size. Available with 12 dies or less, this machine operates at a maximum drawing speed of 4000 feet per minute.

It can be furnished for drawing on spools, or coils, or as a combination machine for both as shown.

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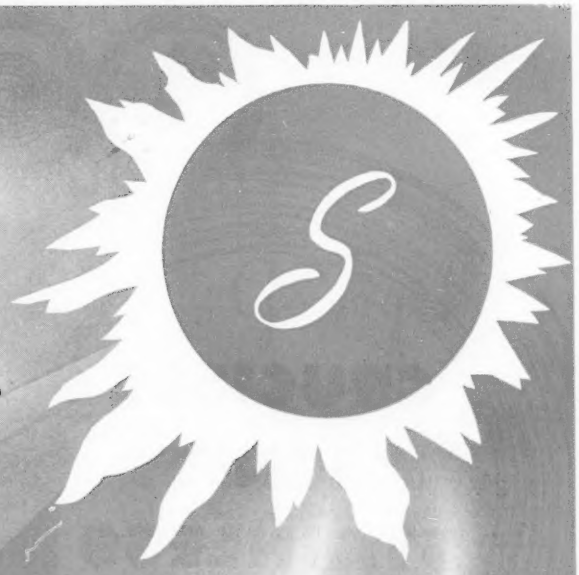

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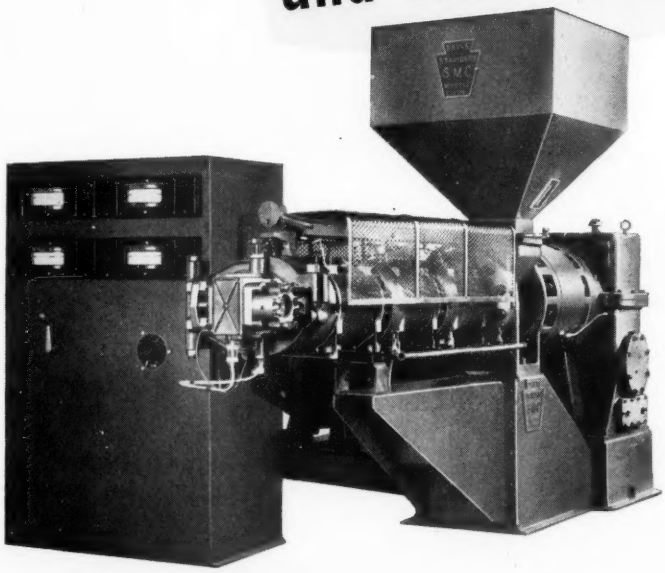

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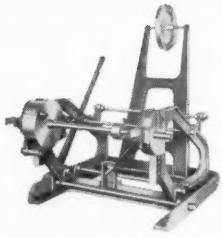

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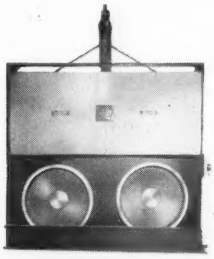

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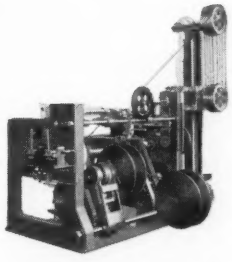

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The Wire Outlook

By all standards, the New Year ought to be a good one. All that we should experience is a shrinkage from boom peaks to levels that a few years ago would have been considered excellent.

There is a surprising unanimity among business leaders on the question of a continuing satisfactory volume of business at least through the first half and probably through the entire year. Where a drop of 10 to 15% was predicted a few months back economists are now revising their ideas, one poll indicating that total business will be off only 3 to 5%. This would provide a national income of 350 billions, which would be higher than that of 1952.

The automobile companies will be making their steel commitments on the basis of an expected production of 5,200,000 units in 1954, which is 15% down from last year. Big steel companies are booked to operate on 80 to 85% of capacity for the first half, which is not too far below 1953's 90% average. Steel orders for the first quarter are showing a noticeable pick-up.

Home building this year will be stimulated by easier terms on interest rates, down payments and mortgage amortization, if the new Congress takes the necessary steps, as now seems probable. Government and private sources look for a dip in building construction of 2 to 3%.

Production equipment manufacturers should find in 1954 a fertile opportunity for sales. Machinery has a habit of wearing out or becoming antiquated. It has been estimated that 28% of our production equipment is either obsolete or inadequate. One survey reveals that 30% of the metal working machines are obsolete, that 34% of present inspection methods and equipment are behind the times, that 28% of our materials handling equipment or processes are in need of modernization or replacement, that 25% of industry's welding equipment is outmoded and 23% of present grinding and finishing equipment is old or badly worn. The only way to combat higher costs is to produce more cheaply with better equipment.

Our ever-increasing payrolls have placed this country in a most unfavorable position in world markets. Tariff revisions are under consideration, but are not necessarily downward. The Secretary of The Department of Commerce fortunately is aware of our predicament and believes that wage differentials between this and other countries must be considered in any tariff alterations. Right now many types of wire and wire products are being delivered here at 10% or more under our prices, because of the lower foreign wage scales.

Aluminum is now in ready supply and from here on it looks as though there will be a keenly competitive struggle between aluminum and other metals in all cases where they may be used interchangeably.

Tin is another important metal that has emerged from a scarcity status. Not only is it in good supply, but latterly there has been imported more than can be consumed.

Copper is pretty much in the same boat. With Chilean, African and our own mines catering to American users, the supply is now more than ample for all needs, including stock piles.

As a result of these changes, it is expected that copper, brass and bronze wire—as well as other forms of copper base-alloys will sag in price, with copper steadying at around 27 cents.

A good year is expected by fastener producers. Rods and wire are in good supply and while dollar sales may be off as much as 10%, the industry believes it will be able to earn more money this year.

Spring makers are optimistic. The final quarter's operations are usually considered a good index to the coming year. The industry's backlogs in the last months were about twice that of normal.

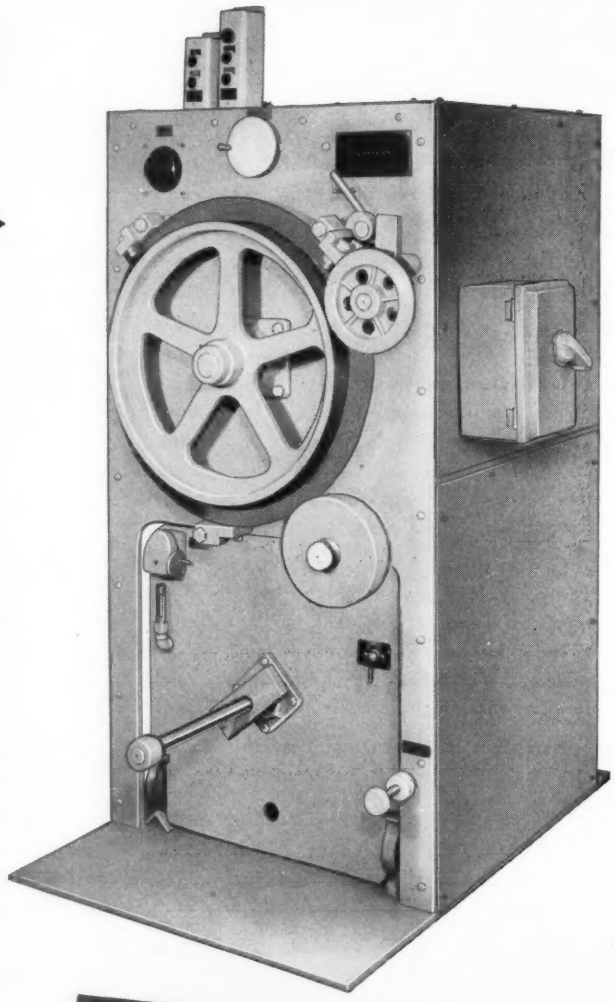
One dark cloud on the horizon is the wave of strikes that labor is planning in many quarters in an effort to make up the extra income formerly secured through overtime. Practically all business, whether private or public service enterprises, will be threatened and possibly affected. If there be any one factor in our economy that could precipitate a serious decline, it is a greed in union leadership that seeks ever to secure advantages for members to which they are not economically entitled and which results only in another inflationary spiral.

Two things are always with us—problems and opportunities. In any event, we wish you all a very Happy New Year in which your problems will be solved and your opportunities converted to achievements.

—from the Editor's Desk

HEAVY DUTY ENAMEL WIRE TAKE-UP

for heavy rectangular and round magnet wire



OUTSTANDING FEATURES—Accurate, uniform wire speed without chattering. Stationary traverse sheave is adjustable for wire width and has an axial adjustment for positioning the wire with respect to the reel.

DESCRIPTION — The fabricated steel frame encloses the drive mechanism and is mounted on a steel bed plate.

The Capstan is Meehanite, with the outer surface polished. The wire is moved axially by means of a fleeter ring with adjustment for the fleeting angle. This type of construction gives accurate wire speed without chattering. The Capstan is driven through a worm and gear to produce uniform wire movement. A rubber covered pressure roll is used to hold the wire in contact with the Capstan to prevent slippage during reel change.

The controls are mounted on the front of the machine, permitting the machines to be installed close together. The controls consist of a speed controller and indicator for the Capstan, a Variac for tension control, and a trimmer for fine traverse length adjustment.

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See page 83 for a complete listing of JLE Products for the Insulated and Bare Wire Industry.

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A monthly publication devoted to the production of Wire, Rod and Strip.
DRAWING — ROLLING — EXTRUDING — FORMING — FABRICATING

Vol. 29 JANUARY, 1954 No. 1

Reminiscings of an Old-Timer

by Charles D. Johnson
Worcester, Massachusetts

THE MORDICA MEMORIAL LECTURE FOR 1953

Mr. Johnson, former president of the Johnson Steel and Wire Company, has done much to make wire history over a long period of years, replete with achievements. He was selected for the honor of delivering the Mordica Memorial Lecture by the Board of Directors of the Wire Association at its meeting in Cleveland in November, 1952, an invitation that confers upon the recipient the highest honor within its power to bestow. Mr. Johnson presented the lecture at the Annual Luncheon of the Association in Chicago on November 11, 1953.

Due to illness and inability to attend the Convention, Mr. Johnson's lecture was delivered by George E. Seeley, Vice President of the Maryland Fine and Specialty Wire Company.

In one way this idea of introducing myself seems quite unnecessary, because of my late friend, Ken Lewis, with whom I had the great privilege of association and friendship for many years. This really amounted to an intimate friendship, and that is why he wrote this article called "The Vanishing American." Practically all the material that he assembled in this article he accumulated from associates and men who had been working for me for a long time. I had no intimation that he was writing the article until he 'phoned me and asked if he could see me some evening as soon as possible, as he had a job that was urgent and he thought I could help him quite a bit. He then advised me that he thought I would not like what he was going to ask of me—my permission to have him publish biography of my activities in the steel wire business. He reviewed what he already had and then thought I could add to his material. I protested some of his humorous anecdotes that he had gathered, but he vigorously prevailed upon me and asked if I would be a good sport and let it stand as it was and, finally, even I couldn't help but chuckle and tell him to go ahead.

★ ★ ★

I hope you will bear with me for a few words that will be, I am afraid, rather tiresome for you to listen to, but after having read the article written by my friend Mr. Lewis, I felt I would start from the beginning of my venture in the wire business and bring out a few highlights in my career.

★ ★ ★

To begin with, in my own back yard, I set up a building about 65′ x 25′. Now that I had my building complete, it was part of my plan to have much of this equipment made in my present building and work that had to be done outside with secrecy. Fortunately, I found a family of a father and his three sons who had both a foundry and machine shop in Palmer. I naturally had to assure them that they would have as compensation all of my business, provided I could give them my plans in complete confidence. With this assurance, I proceeded from there; this took about two years. The different individual parts that composed this unit were

IN MEMORIAM

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made up of a patterning furnace, a 20-block wire-drawing frame, very ruggedly built, so that it could take on one end three 16″ diameter blocks and the other 17 8″ blocks. From this frame, the wire was processed on the continous machines. There was also a small cleaning house with its tubs for acids, coppers, etc.

★ ★ ★

Three of these machines were single-block wet machines, purchased from Waterbury-Farrel Company, and two other machines that rounded out the fine wire capacity were ones that I had developed, and in many respects, in my opinion, were more versatile than the Waterburys, in that they would receive a heavier size and in the same respect, would finish the wire as fine as the Waterburys. I was not too sure of this until I had really operated them for awhile; otherwise, I would not have paid the price that I had for the Waterburys. The fine wire machine that I had manufactured outside in different parts I assembled myself. They were not only more adapted to my requirements at that time, but they took up less than half the room than the Waterburys. This fine wire machine was designed so that it could be used to finish a dry-drawn wire. This proved to be quite an asset at that time and it was the first time, as far as I and my father could trace, that an improved plough wire in these fine sizes was ever drawn dry. It could draw wire both dry and wet, so at this point I introduced fine rope wires that were all previously drawn by the wet process.

★ ★ ★

The outstanding advantage was in a lower cost and the finished dry wire had advantageous characteristics in some respects that the wet wire did not. It may be interesting to mention here that from this early observation and experience in drawing fine wire dry, that many years elapsed, in which period I accumulated more knowledge and vision. At this time I decided I would strive for one major ambition, and that was to live to see the day when my wire mill would not be drawing wire in liquid solutions. This I eventually succeeded in doing to 90% of my production.

★ ★ ★

We also had a frame for straightening, crimping, rewinding, and generally preparing the wire in different sized diameter coils for the trade. Then too, we had a small oven for drying the wire in preparation for finishing dry drawn wire. So up to this point, I had enough wire-drawing machinery and also the equipment to process and finish diamond dies. It must be remembered that at that stage of the game, there was no such thing as tungsten carbide. However, we did have our steel plates that were processed by the peening, drifting and reaming method and we used these plates in conjunction with wire-drawing on the continuous machines, starting with the first pass and with careful manipulation and treatment of the wire, we were able to use them on the first five or six holes of the 10-draft machines. The other passes were practically always used in diamond dies, but we could never use anything but a diamond die on such hard wires in the last three holes. This completed this little wire mill.

★ ★ ★

However, there was the very ticklish problem of finding a source of supply of steel wire of a gauge that would fit in with this small mill. As it happened at this time that there were only a few long established mills engaged in this work; to ask anyone of them for processed wire, which eventually was to be finished and sold in competition with them, had to be handled with great care.

★ ★ ★

I happened to hit upon a thought that eventually solved this serious situation, that is, remembering a man who possessed the means of getting what I was after. He was a very good friend of my father's, from the time they had emigrated from Sweden to this country and both entered the wire industry at Washburn & Moen, later the American Steel & Wire Company. They both started humbly, as laborers, and as they both showed much promise, were eventually promoted. This man was Julius Johnson; he was offered a position with the Washburn Wire Company in New York, where he finally became the manager.

★ ★ ★

In the meantime, by hard work, my father gradually arrived where he was next in line to become superintendent of Washburn & Moen's round wire departments. It was during this period that he accepted the proposition to engage in the manufacture of high carbon steel wire for the Goddard Works of the Spencer Wire Company. Now, it was through this friend Julius, to whom I divulged my complete plans for starting a small wire mill and engaging my father, that he agreed to furnish me with this product which I needed so badly. So, on leaving him in New York, I had in my pocket a signed and sealed contract that would carry me through for five years. On my return home, it was a tremendous relief to my brother Ben to know that we had our source of supply for steel assured. I want to mention at this time that when we were eventually in operation, I told him that for his very hard work and loyalty in my venture, he would be compensated in the form of stock certificates, his share of partnership in this company.

★ ★ ★

Meanwhile, I had been carrying on continuous correspondence and occasional visits with prospective customers for my product. Naturally, it is understood that I had access in my place of employment to records such as names of customers, and to a certain extent, access to the selling prices of these wires.

★ ★ ★

It became evident to me that it was very important to not in any way divulge my identity or my present association with the Goddard Works of the Spencer Wire Company. This, of course, would have been fatal to my success and that of someone else whom I will mention later. Furthermore, it was necessary that during this period my pay envelope continued coming in.

My name being Charles David Johnson, I changed it to Charles Davis, reasoning that in dropping the Johnson, I would create a state of confusion for the company I feared most, namely, the company that through my father, had already established a highly perfected product. In using this change of identity, I arranged that all correspondence be forwarded to me general delivery. After a few weeks had passed, while I was making my first contacts with prospective customers, giving them quotations and familiarizing them with my intentions and promises that I would be ready to deliver at a given time, the incident occurred that I knew was sure to happen.

★ ★ ★

This I found out one evening at supper with the family, when my father seemed worried and not himself at all. Mother noticed this also and asked him what he was worrying about. His answer was that the officials of the Spencer Wire Company advised him that someone around Worcester county was planning a wire mill and that the plan was to make the same type of wire as they were—in fact, this new mill was already quoting prices. Then they asked him if he knew anyone by the name of Charles Davis. Of course, he replied he didn't know any Charles Davis. After all, he did not know that I was carrying on under an assumed name so while it proved to be a terrible shock to him, to me it sounded like music. He told me that I had almost made a liar out of him and he became very much excited, as Dad was a very religious man and one of the founders of our First Swedish Baptist church. In effect, he said that I would ruin him eventually. I told him then and there that I was definitely sure that when my wire mill was ready to go, I felt he would be the most important part of this plant and that it would be the turning point of his life for the betterment of the whole family. He dropped the subject by saying that the officials were going to contact the post office and find out the true identity of this Charles Davis. This really put me on the spot, but fortunately, my correspondence was practically completed and I immediately decided that I would not again show my face at the post office window for general delivery. Instead, I carefully tutored my brother Ben, in the event of any questioning, and then waited for a spell when I figured the last of the correspondence would be coming in. Ben then went down to get the mail for Charles Davis and he was asked where Charles Davis's business address was. To this he replied that he had no permanent business address, but would shortly have one. Fortunately, the clerk handed him the mail without further questioning, but you can rest assured that was the end of my general delivery business correspondence.

★ ★ ★

Finally, when my brother Ben and I gave in our notices, it suddenly occurred to the officials of the Spencer Wire Company, our employers, that I was the Charles Davis they were mystified about. So, I was called in the office by one of the leading officials and told, in effect, that I had a h—— of a nerve to even think of such a foolish thing, that it would be impossible for me to succeed; also, if I had any intentions of involving my father, that I would ruin his life. This reaction from him was quite natural, as at that time I seemed too youthful to have any such ambitions.

★ ★ ★

However, I told him not to worry about my father as I would soon prove to him that in our own back yard, there would be wire made in a matter of days. I departed by saying that this little plant was free of all indebtedness and as I have already mentioned, if it was a failure, as he predicted, I had only to turn the key; also that my father, having finally realized that in his 12 years he had established their company in a product that was then running into sales of around two million a year, he would have no difficulty in improving his position elsewhere, as, if I remember correctly, he was receiving only about $65.00 per week, which was slightly more than some of the highly skilled men under him.

★ ★ ★

Now that we were free, Ben and I immediately started firing up our patterning furnace on our arrival home. By midnight, we had our ten strands running through this furnace, preparing the first operation to start filling our orders. While Ben slept until morning, I continued the operation of the furnace all through Saturday night and into Sunday. By Monday noon, some of the wire had reached the fine wire machines. In other words, when my father arrived that Monday noon for lunch, the real test of my salesmanship faced me in selling him the idea of becoming my partner.

★ ★ ★

Naturally, one major thought in the business end of the plan was to induce my father to leave his present position and become associated with my venture. I felt that with his established reputation, which was known throughout the country,—inasmuch as he was very often referred to as the senior steel wire maker of America,—it was quite simple reasoning to see that if I could induce him and capitalize on his reputation, I could by-pass many obstacles that I knew would have to be overcome. My plan was to actually bring this unit up to the point where between myself, my brother and a laborer, we could finish steel wire.

★ ★ ★

Let me say that during this long period—it took about two years getting this unit ready—my father never once came within the walls of the building, because of his loyalty to his employer. Of course, he knew that Ben and I were carrying on all this time. I once asked Mother if Dad ever inquired about our activities and she replied that the last time he spoke of it, he said that at least it keeps the boys off the streets, out of pool rooms, and so forth.

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So now, Ben and I took him down to the rear of our property where the wire mill stood, opened the door, and invited him in. As he stood there, Ben and I naturally were eagerly waiting for his reaction. While he was casting his expert eye around this little mill, a satisfied expression appeared on his face and he said, "It looks like

a mighty good job." Then and there I gave him my proposition, namely, "What do you say, Dad, if you come in this venture with me, we will name it Johnson & Sons and you will be the President. We will organize this company and I will give you gratis, also Ben, a liberal portion of the common stock. I will retain the financial control, but I will practically guarantee that your salary will not be less than double of what you are getting now, after we have been in operation six months." Even as conservative a man as he was, he believed me, and I will never forget that grin of satisfaction when he said, "O.K., I will go back and give my notice this afternoon."

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Now that all is set to operate this little mill, free of all incumbrances, I want to mention at this time to the prospective young businessman, that it is quite an asset, if possible, to start without mortgages or notes. But in this day, this is virtually impossible. However, try to remember never to start a business on too much borrowed money, as experience has taught me in my several ventures that the first three years seem to be the real test and if all looks well at the end of the third year, the chances are good that during the fourth year, you will see your first profits appear. If at this time, this does not happen, I feel personally that this venture needs a thorough investigation, or at this point, you will very likely start going down hill as so many have done. If you have the patience to wait and work a little longer and a little harder so as to improve your financial status before entering into business, you will find it most rewarding.

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Everything went smoothly, until my father suggested that we expand. I told him naturally, I couldn't see how we could expand until we accumulated more capital, as we had already used much of our assets to purchase land in Jamesville with the view of eventually moving to this spot. He then told me that he had been approached by two friends, who had proposed that we recapitalize and form a corporation. It was obvious that these friends had thoroughly sold him this idea. I protested vigorously, inasmuch as I had intended to keep this business strictly within the family, but my father, being the president of our little company, finally had his own way and completed all the plans for this new organization, which was the beginning of the Worcester Wire Works, Incorporated.

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We then had a mill that was complete, as a wire mill goes; that is, we could buy the rods and feel a little more secure in our source of supply. As we were a small independent who had broken the ranks, during those years it was difficult, without almost begging to buy rods, so we purchased them from whomever we could. The only reliable source we had at that time who were producing a high-carbon rod of good quality, were the Wickwire Brothers in Cortland, N. Y. As I remember this rod, it was extra good until it went beyond 65 in carbon content and a good portion of our wires were made of carbon contents that were between 68 and 75. We contended with this situation for a number of years, until the Bethlehem Steel Corporation came into the picture with us. From then on, we had somewhat easier going in this respect and the business prospered along the lines of a fairly well established mill producing diversified steel wires.

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During this period, I tried to persuade my father to go into the music wire business which was the particular wire through which he had attained his great reputation as a maker of high quality high carbon wires. However, he said he never wanted to go into music wire again, because it involved a very large financial investment and such a big inventory had to be carried at all times of the finished product. Also, there were too many headaches in this business and he thought that the profits were not sufficient to warrant the risk. I suggested making music wire along different lines, which would completely change the situation and turn this into a very profitable business, but, as my father was ultra-conservative, he just wouldn't listen to me. So, I will take this subject up later.

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Shortly after this, father became very ill and the doctor advised him to give up work immediately, his illness being pernicious anemia, which in those days was incurable. He told me the doctor gave him one year at the most, but due to the great care he received at the hands of my mother and sister, he lived two years, so that during this period, up to the time of his death, he never reentered the mill, which left me in complete charge.

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Just before he passed away, he called me to his bedside and told me that in time, he found he had put too much trust in his business associates and admitted that he should have consulted me. I had warned him to be careful of what he signed and to be sure that he had the very best legal advice. He then admitted that as one of the associates was a lawyer, he thought this man could furnish the legal advice. So it goes with family affairs. In helping to straighten out the estate he left, I discovered that, in replacing my father, the board of directors had the power to vote in their own choice. With the by-laws stating that the board should be composed of four members, I found I would be alone against three.

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Unless I could straighten out this matter, I decided I would dispose of my holdings and start a new company. After many difficulties, particularly breaking a life contract, which forbade me to make steel wire for anyone but this particular company, I finally succeeded in severing all connections. However, although it left me with very little finances to begin a new mill, I did manage to salvage enough to get started with my next venture, which my wife named The Johnson Steel & Wire Co. This now made venture number three, so by this time I had a fair backlog of experience. I decided to plunge and pick up some of the years I felt I had lost through past mistakes and experiences.

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In casting around for an idea by

which I could do this, I finally selected a wire with big tonnage potentialities, so that if I did have success as I had previously, industrially speaking, I could turn my capital over more often. So, to begin, I selected tire bead wire on which to concentrate. We had engaged in this business at the Worcester Wire Works in a moderate way. At that time, the size was an .025" with an extra strong specification and made in both tin and liquor finish. As most of my very best wire drawers followed me, it didn't take long before, if I do say so, with good skilled help and good management, we made rapid progress with these wires. Of course, we manufactured other wires, some fine, and fine rope, for overhead business.

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It was finally decided to change the bead construction and use a much heavier wire, which was .037", with a tensile strength around 300,000 pounds per square inch. We were finally presented with a specification of a wire that had a minimum of 285,000 pounds per square inch. Every full strand that was cut from the coil individually had to be such that both ends met accurately. It had an elongation specification of a minimum of 3½% and 5½% maximum of the breaking weight of the strand and the first yield point had to be very close to the breaking strain of the wire. This specification had never been made before. For instance, a wire made to that tensile strength, such as very hard rope wire, the very best in this country would hardly be 2%, and it was considered a good wire if it stood 1¾% elongation.

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At that time it really seemed fantastic, but as it was such a serious problem to the tire makers due to these individual wires breaking in usage and piercing the sidewall, causing blowouts, they told me that if a wire could be made to the above specification, it would reduce the sidewall blowouts by better than 90%; any blowouts would then be the result of bruises to the tire or defect in the products of which this tire was composed. They also told me in confidence and with much emphasis that if the automobile riding public ever discovered that this was caused by the point of a wire from the inside causing practically all blowouts, they would have enough lawsuits to put them out of business.

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After many months of research, I finally hit upon an idea that eventually proved to be the answer. This wire was immediately used in tires, and found to stand the severest tests to which they could be put, such as bad roads and severe shocks. For some months, everything seemed to go along fine, but after enough mileage had been put on these tires, they found that they had more blowouts than they anticipated, although they were far less frequent. So, upon the examination of a cross-section of a tire, we found that it wasn't because the wires were breaking, but because they were working loose from the rubber through heat and other reasons, creating moisture and chemical action, so that we actually had a sort of hollow space. We then realized that the wire should have perfect adhesion to rubber, so that when it was vulcanized into the rubber, it would be impossible to tear it away without the rubber adhering to the wire—in other words, the aim was to create a wire that had perfect adhesion to the rubber. It was then decided that this wire should be stripped of all foreign matter and coppered; from there, completely neutralized and baked through rather a unique process for which we received patents, with the final result that this specification was drawn and perfected from all angles to meet these requirements. I am sure that it is still being used without having undergone any changes. Here let me mention that for quite a long period our competitors, in spite of learning that this wire was being manufactured, didn't believe it. It finally became evident, as they were losing business every month; eventually we divulged these new methods to our competitors.

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The next wire that proved to be very interesting was music wire. I decided to go into this at the new plant as I had virtually been brought up in music wire atmosphere and had drawn some myself. Then, too, I felt pretty certain that the new method I had mentioned to my father would prove to be more practical and beneficial to everyone concerned. May I mention, before I proceed with my experiences in developing this wire, that from a strictly business point of view, I had visions that this high-priced wire that had been used sparingly in the automotive business and other industries that required a wire with so many fine characteristics, such as fatigue, etc., that if we could develop the wire I had in mind, it would make it possible to produce it at a much lower cost; this in turn would eliminate the cheaper spring wire that was being used almost exclusively in these industries. Naturally, if this could be accomplished, music wire would eventually be used practically 100%. As time went on and this new music wire became firmly established, this reasoning proved true. The tonnage at the height of success at the Goddard Works, where my father had introduced music wire, was running between two and three thousand pounds per day and they really were considered the leaders. It was then being used mostly for pianos and other harmonic purposes, the dental field, etc.

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One of the leaders during the period of introducing this wire, captioned his advertisements with "Beware of Synthetic Music Wire." However, as we struggled to promote this product, it seemed to actually amuse my sales force and to urge them on to greater efforts. They would tell me it certainly proved that they were worried about our so-called "synthetic" music wire. I would like to mention here, that during this period of research, we had the cooperation of one of the largest typewriter manufacturers and other machines for office equipment; also a company who were making wire springs of all types. Because of the confidence that these two companies put in us, we eventually perfected a wire that was much cheaper and more reliable in all respects, so could bring this problem to its final con-

clusion. I don't recall exactly how long it took us to really perfect this product of which we were all very proud. The method was almost completely different and it was now possible to draw music wire and finish it without any experts, just plain everyday wire drawers. Previously a good music wiredrawer had to have at least four or five years experience before we would trust him as a fairly reliable operator. As my closing remark on this subject, it proved to be the most profitable wire I ever handled.

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Another product that added to our laurels was our very fine tempered wires. Among these was card clothing wire that we made in large tonnages. For uniformity and accuracy this is probably the most exacting hardened and tempered wire that is made today in large lots. This happens to be one of the wires that my father selected to manufacture when he went to the Goddard Works of the Spencer Wire Company and brought the quality to a higher standard.

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As I reminisce, it occurs to me that this card wire fascinated me more than any other. The first patent rights that I received on this wire were at the Worcester Wire Works. Later on at the same mill I made further improvements, receiving another patent. So, at the Johnson Steel & Wire Company, when I decided to go into this wire, it became a fresh challenge, as I had to break my own patents. This compelled me to change my thinking into new channels. The outcome was a finished tempered wire that exceeded anything we ever did and we enjoyed a fine business right up to the day I left the old mill.

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I would like to tell you of a wire that gave me real personal gratification. This particular product had left a trail of grief and pain for many years, especially during wars. This is the Signal Corps wire. My first experience with this wire was during the Russo-Japanese War, while I was with Dad at the Goddard Works, operating a group of wire-drawing machines and supervising the tinning furnaces that finished this wire. This was a seven-day week affair, night and day, during this war.

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The second time I became well acquainted with this wire was during the first world war, at the Worcester Wire Works, where we manufactured tinned signal corps wire for England, France and her allies, and finally, for our own Signal Corps. At that time, Mr. Harris, the inspector who checked all of this wire for our country, told me that inasmuch as tin had to be used for a rust-resistant coating, it was too bad, because it had to be imported, and under damp and wet conditions, it would tarnish and rust in spots, causing short circuits. Naturally in sending messages during battle, they often didn't get through. Consequently you know what the results would be at such times. Therefore, he said it had been nicknamed "Sunshine Wire," because of its action. He told me he had talked on this subject extensively with my father, as to how this condition could be improved, but he said Dad felt he did not have the answer, saying it was impossible to accomplish, but that we would just do the best we could until something turned up. I told him Dad and I had often spoken of the possibiilty of galvanizing this wire, thereby making it fool-proof, but felt that a wire of such high tensile strength would not stand submersion in spelter without becoming brittle and useless for this purpose.

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Now we will come to World War II and our new plant, the Johnson Steel & Wire Company. One day, who walked into my office but Mr. Harris, the old inspector. I recall I mentioned to him that I thought he had retired, but he said the government called him back because of his long experience in this particular wire, also saying he thought we would become involved in this war. What he wanted to know was if I thought that this new mill of ours plus the long experience I had with Signal Corps wire, gave me a better opportunity to galvanize this wire, rather than tin it. I was happy to tell him that because of more modern equipment, better furnaces, improved and new wiredrawing equipment, our chances were most certainly improved. We were already heavily involved, and it was a rather tough time for research and experiments, but I had no feasible excuse to offer, so I promised him that it would take me only a few weeks to lay plans. He said if I had any luck he would devote full time to this project.

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Eventually we had a wire with a galvanized coating that for a hot dip had an exceptionally heavy application of spelter and a very fine, smooth finish, with no indications of brittleness whatsoever. Mr. Harris said that the torsion tests were better after, than before galvanizing. I don't like to brag too much about this, but I think he was correct. So you see, although they wouldn't allow me to carry a gun with those boys of ours who were down in these stinking islands where the tinned signal corps would rust overnight, God was with us in our endeavors.

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The achievement in mastering this problem came about because of the changes made in this new mill. Again, the fact that I had a humble understanding of the stresses in steel wire, led me along the right channels of thinking to accomplish this problem. We were now ordered to at least triple our capacity of Signal Corps wire and to discontinue and revamp our present tin-coating capacity into galvanizing. They gave me tonnage figures of no less than a carload every two days. Previously, I had informed them that I doubted if our competitors could make such a drastic change-over in such short notice, not only in their galvanizing practices, but other processes; so, for this reason our company had to shoulder this heavy burden until Bethanized wire came into the picture. I could not have accomplished this using a wet drawn fine steel wire, but used a dry drawn wire which had become standard practice with us.

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When Bethanized wire was introduced for investigation by the Sig-

nal Corps, at this time we were in full swing, shipping our wire. It is a coincidence that this steel wire, directly after Bethanizing, had about the same characteristics as the hot dip process, in that they are both inclined to have these brittle and overhard characteristics, especially in a spotty manner. It so happens that Bethanized wire lent itself to drawing after this process, which brings back the ductility and toughness it should have. After much experimentation by the Signal Corps with the Bethanized wire which did not meet the spelter specification established by us, it became evident that the thickness required would have to be lowered. It was at this time that Mr. Harris informed us of this failure and notified us that they had reduced the specification so that this new source could become engaged in the manufacture of this product. This was naturally a disappointment to us, not because of any loss of business, but because we felt a good heavy coating of spelter on the wire gave better protection.

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It was only a matter of time when other mills were using this Bethanized wire for the Signal Corps. Production was flowing along quite smoothly, but at this point they began to find discrepancies and indications which seemed to grow worse, that the spelter again was not meeting this specification. So, for the second time this spelter specification was reduced. The difficulty was that the coating on this Bethanized wire was peeling off while it was being drawn in the wet machines and we were told by an official who had a little mill in Leicester that every so often he had to stop his machines and shovel it out so that he could continue. I am of the opinion that ways and means could be found to overcome this trouble if enough time was given to it along the lines of finding the proper lubricating materials.

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One of the obstacles that had to be met that really seemed impossible at that time, was in handling so many tungsten carbide dies to manufacture this great tonnage. At this time our die box was composed of 27 diemakers and this department was then running around the clock. The dies with this system were really a handmade job, especially as the wires became finer. At the very best, these men produced only 150 dies per day and with the tonnage figure they gave me, I needed at least 1200 dies per day. There was only one avenue of escape, and that was to completely change the method of finishing tungsten carbide dies. With the present method, it would take a good man 12 months to learn how to finish a die and much longer, until he was considered a good diemaker. This was a tough department and practically all these men were like primadonnas in their independence. This condition had bothered me for a number of years and I had given this problem much of my time, so that during this time I had already, in my mind's eye, practically a complete vision of a straight line production method, consisting of turning out these dies in a series of single operations with unskilled labor. It required to do this, five or six different types of machines and I immediately organized a small group of men from my own ranks and a die and tool company, with whom I was very well acquainted, and we proceeded to make these machines one by one, through the method of trial and error.

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Eventually, we were delivering a tungsten carbide die in this new department that could be finished in four operations. I then had the problem of equipping this department secretly, so to speak, and it was always under lock and key. We decided to have only girls handle this work. I interviewed these girls and gave an I. Q. test, for which I had set the standards. Soon we managed to keep pace with the stepping up of the production of the wire, so that when the necessary production was finally reached we were producing 1200 finished dies per day and sometimes as many as 1500. The satisfaction of this whole die enterprise was that it took no more than one week to train a girl to make her proficient in her particular operation. Every die that was finished was exactly the same as the previous one. In test after test of the finished dies, it was every day experience to test 100 dies of the same size and not find one of them that varied more than one-tenth of a thousand, plus and minus.

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As I reflect on this job, I can't help but marvel at the patience, endurance and belief in me that this would eventually be a success, as the skilled group of men selected for this seemingly impossible job to be done in such a short time, literally worked around the clock with me without complaint. Without such cooperation and friendship, I could never have succeeded with this project.

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There was then no further use for the old die box with much higher wages; we now had 30 girls working happily under no strain, producing sometimes as many as 1500 dies a day. As this project with the Signal Corps was now complete, we were the first ones to be honored with the Army E in Worcester.

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As time will not allow further discussion of more wires upon which we improved, I would like to touch upon the personal relationship with my people and the gratification and pleasure in working directly with them. When I say directly, I mean that during all the time from entering into this business venture until my retirement, no less than 70% was spent directly among the bosses and the men in the factory, and not in my office. I was continuously circulating from Department to Department. As you all know, some of these places were greasy and wet, some were dusty and dry with their lime and soaps. Others were filled with steam and acid fumes and all sorts of unpleasant odors from tubs of different liquids, the compositions of which at times, were even a mystery to me, in that we had no elaborate research department; but they all played an important part in their functions. We all had a hand in mixing these soups and it was really great fun. In following my theory along this line, I gradually was so attuned, through constant association with these hum-

ble working people, that I could actually understand the lingo of the different nationalities, even those who could barely speak the English language.

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So you see, my friends, at this stage, from their point of view, I was not the Founder, President and General Manager, but had become their friendly counsellor, to the extent that in some cases, which were not only embarrassing, but disagreeable, they would bring their intimate family problems to me, such as the lodger who was working the night shift, and was naturally at home while he was at work. At other times, his troubles were in a different nature, such as illness in the family, etc.

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What I am going to say at this point I would like to address directly to the young group in this audience. Should you want to really understand your people and your product, you can never do so by spending all your time in your office, especially when you already have responsible people taking care of the business routine. Through your association with your bosses and these people, you have not only made many real friends, but it has made it possible for you to have a thorough understanding of all the phases, problems and individual secrets from operators who spend most of their waking hours repeating a particular job day in and day out. This naturally imbeds into their being a high degree of understanding and knowledge of how this particular little job should be done. In your contacts with these individuals, they will many times suggest ways and means to ease their tasks and not only improve and increase your own knowledge and experience, but be of infinite value to your company. Also, their suggestions lead your mind into new channels and at these moments you naturally have your notebook and pencil in readiness, so that later, in your spare moments, you can relay them to the supervisor or the bosses as a whole, if it was important enough. This is one phase of the advantage of this idea that I am trying to put over.

Another phase that is especially important in these days, is the highly organized labor organization. You have, by natural processes, become the key of understanding with all labor problems, both from the group and the individual, to the extent that you and the bosses will handle any grievance before it reaches the proportions where it has to go before a committee.

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I would also like to mention here what I consider a point that has almost become lost. Through a long series of events, reasonable and honest discipline has practically disappeared, and if we ask ourselves why this is so, we will have to admit that something has happened to have brought this about. I believe if any single person, or group of individuals in this organization, have violated rules or been guilty of outright carelessness, either against the company or their fellow workmen, they can be warned of their violations without causing any real breach or ill feelings, because of the established interest and understanding of their superiors. Therefore, you have used discipline where it was necessary, without creating, as sometimes happens, a serious grievance that must be taken up in a meeting of a selected group of men, who are called grievance men, and also a group of company officials who must devote their time to this matter, which sometimes cannot be settled without a great loss of time to both parties. It also leaves behind an unnecessary, disagreeable incident.

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It is my belief that when discipline has almost disappeared, to the point where the executives do not dare to criticize or even give an order that complains about an existing condition, it is then that we generally start to fume and curse the unions, instead of taking, as we should, practically all the blame upon ourselves for having neglected this very important factor, discipline. With the time spent in the factory and the close association with the people and the bosses, it should become apparent that the bosses are gaining knowledge, making more progress, and being urged to greater effort, as their efforts will be appreciated and understood more.

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I would like to mention at this time that when the company had progressed to the point where it had no financial obligations, we inaugurated a bonus system for our bosses and the top executives in the office. A few brief words as to how this system was carried on. Each year, just before the Christmas holidays, the directors and the works manager would make an evaluation of the accomplishments of each executive to determine what his progress had been that year. Some of the main considerations, such as enthusiasm, general behavior, and achievements, were in our opinion the necessary characteristics for a promising executive.

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To give a rough idea of our system: After we had selected a man from the ranks who seemed to have the necessary qualifications for promotion, we then established his salary figured on a yearly basis of his earnings, and added a reasonable amount as an incentive. From there on, each year at Christmas time, he would receive in his envelope a note and a check which would represent an increase in his salary. This salary increase would continue each year until he had reached the limit commensurate to his type of work. From there on, his bonus was predicated on his personal progress and on the amount of profits made by the company in that particular year. From this figure of company profits, a given amount was set aside for the bonuses, depending on the program of the coming year, such as expenditures for expansion, etc. To give an idea of the amounts paid in bonuses during the last years, they amounted to between fifty and sixty thousand dollars a year and were predicated on a graduated scale, depending on the responsibilities and status of each individual. This continued up until the sale of my company.

★ ★ ★

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(*Please turn to page* 100)

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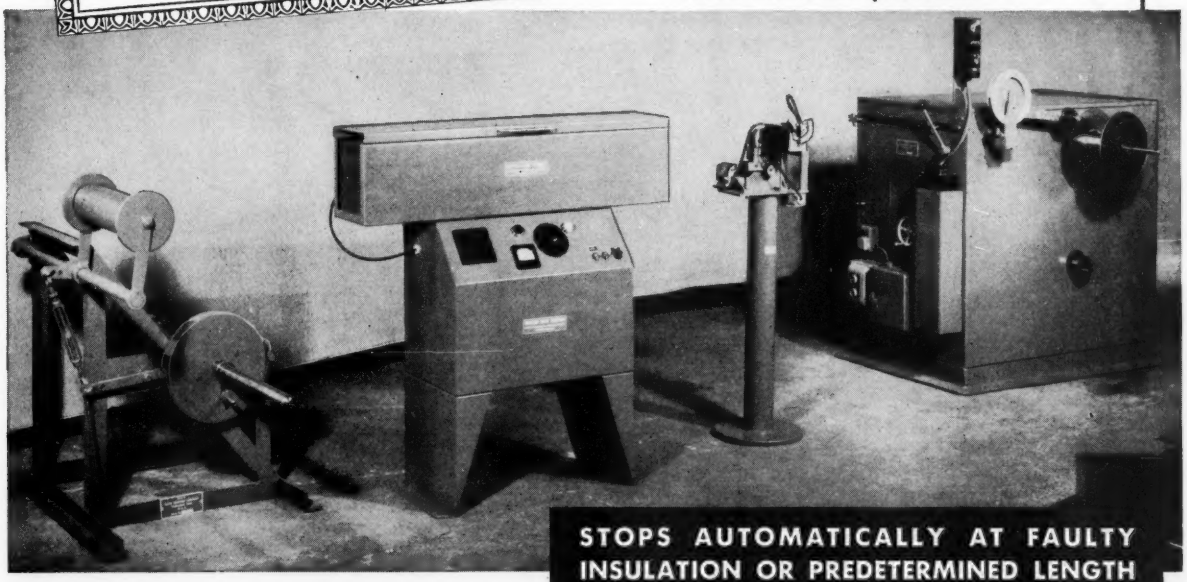

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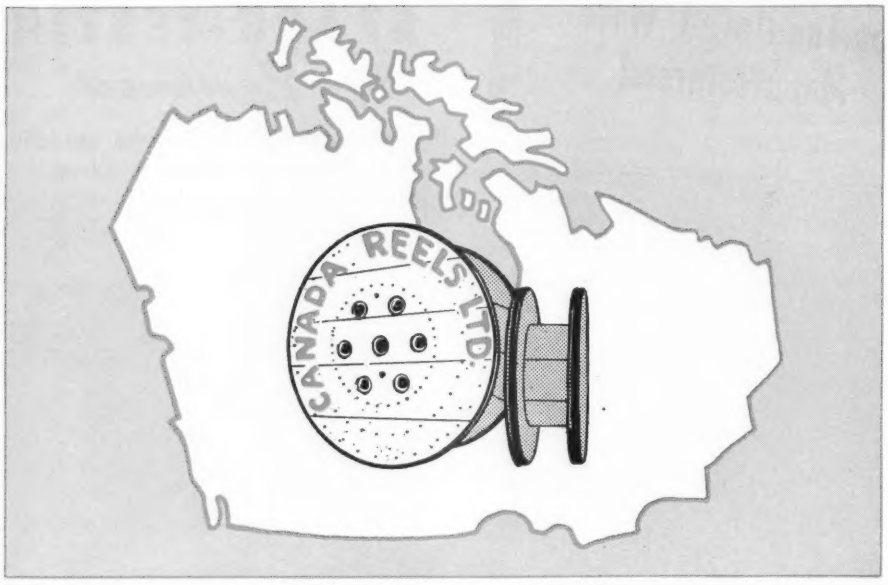

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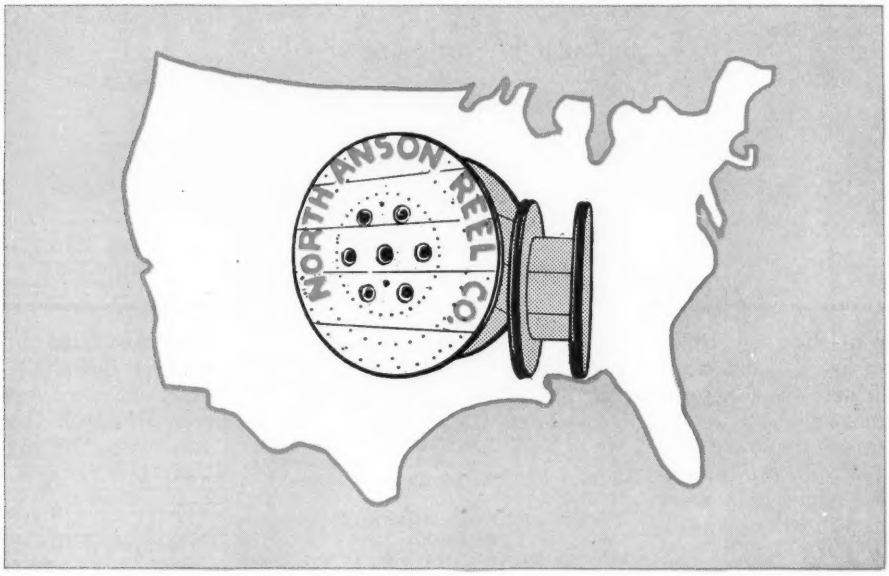

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Just one example of present day reel quality is our metal bound reel now available through 54" in diameter. This reel will save up to 300% over all-wood reels; a fact proved by nearly five years experience in the plant and the field.

Whatever your reel requirements, we can furnish the reel you want. We have the experience, equipment, and the concentrated production of a plant designed solely for the manufacture of reels. We invite your inquiries.

North Anson Reel Co.

NORTH ANSON, MAINE TELEPHONES: MADISON 6-3171 6-4471 6-3367

Target for '54

by Leslie B. Worthington, President
United States Steel Supply Division
of
United States Steel Corporation
Chicago, Illinois

I shall try to discuss something about which we are all somewhat ignorant: the future. On this topic I feel neither more nor less qualified than a throng of my contemporaries; especially those economists who not so long ago were busy seening dreadful days ahead.

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You've probably heard the definition for an economist: the man with a bright look and a Phi Beta Kappa key on his watch chain, but no watch. By the way, I would limit this definition to the so-called prophets of pessimism.

★ ★ ★

Some of these gloomy Guses based part of their fears on the decline in the steel operating rate. It has been said before, and forcefully, that this anxiety over a less hectic pace of steel production is compounded of many things except a clear understanding of the nature of the steel business.

★ ★ ★

People have become so accustomed to a steel operating rate of 100 per cent of capacity or better that they have felt it to be a built-in feature of our industry. Obviously, an easing up of such unprecedented peak performance was called for. We had to shift out of second to a smoother-running high some day; and the result is simply that, instead of putting on the pressure for maximum production, we can concentrate on efficient, economic production of quality products.

Mr. Worthington came from England at the age of five with his parents. After graduating from the University of Illinois, he became a sales apprentice with the United States Steel Corporation's South Chicago Works. He advanced steadily over the years, being appointed Vice President of this subsidiary in 1942 and elected to the presidency in 1946.
He has guided the affairs of this division with great skill and we were honored to have had him as our guest speaker at the Annual Luncheon of the Wire Association on November 11th during the Convention in Chicago.

Even though the steel operating rate has declined and is now hovering around 93 per cent of capacity, there are two big points to consider in evaluating its significance. First, the dip has been very gradual and, second, due to the industry's mammoth expansion programs steel production at 93 per cent of today's capacity would result in far more tonnage than

Leslie B. Worthington * * * * *

that produced in any war year (Korea included). Last week the steel industry produced 2,096,000 tons of steel. In the same week last year the amount was about 2,200,000 tons, a 4 per cent drop.

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Happily, this country's crew of sad sack economic seers has been pretty well squelched. American businessmen have refused to be panicked. Undoubtedly, you have noted, as I have, that instead of getting in the dumps about talk of a "recession," our nation's business leaders are in high spirits and busy with plans to meet a more competitive period. Some are enthusiastic about it.

★ ★ ★

I am happy to count myself in with the enthusiastic corps. It never did make sense to me to have to allocate a customer a portion of his needs. I would far rather have eight I-Beams in the shop for the fellow who only wants one than have eight fellows hot after one I-Beam. It may sound good to have people pounding down your door for steel but, believe me, it cuts across the grain at right angles not to be ready and able to satisfy customer requirements.

★ ★ ★

There is a danger, of course, in sounding like the little boy whistling past the graveyard to keep up his courage. But as I see the path ahead in '54, there is nary a graveyard in sight. And,

STANDARD SIZES

Flange	Traverse	Barrel	Arbor
2½"	3" 3¼"	1¾"	.628"-.633"
3"	3" 3¼" 3½"	1¾" or 2"	.625"-.633"
4¼"	3" 3¼" 3½"	3¼"	.635"
4½"	3" 3¼" 3½"	2½"	.635"
4½"	6"	2½"	.635"
5"	2¾" 3"	3.880"	.531"
6"	3" 3¼" 3½"	3½"	.635"
6"	3" 3¼" 3½"	3½"	3"
6"	6"	3" or 3½"	.635"
6"	6"	3½"	3"
6½"	3" 3¼" 3½"	3½"	.635"
6½"	3" 3¼" 3½"	3½"	3"
6½"	6"	3½"	.635"
6½"	6"	3½"	3"
7"	3" 3¼" 3½"	3½"	.750"
7"	6"	3½"	.750"
8"	3½" 6" 6¼"	4"	3" or 3¹¹⁄₁₆"
8¼"	3½" to 7½"	4"	3.630"
10"	6"	5"	Optional
12"	6"	6"	Optional

Light weight, drawn Aluminum Alloy

Here they are! A complete line of

ACROPAK SPOOLS... any size for any need

Our job is to help wire manufacturers reduce spooling costs and we've built up a record with these strong, lightweight, drawn Aluminum alloy spools. A *complete* line—any size you specify—with special emphasis now on big sizes to meet the trend towards larger packaging for economy. ACROPAK spools have reduced operating and shipping costs for others—why not for you, too?

Do you need special sizes? We have the engineering experience and tool room facilities to design and make any special spool you may need.

ACROMETAL PRODUCTS INC.

Division U. S. Bobbin and Shuttle Co., 616 Fifth Street N., Minneapolis 1, Minn.

in fact, instead of whistling, we've got plenty to sing about. Sure, it will be rougher to sell steel. No one will dispute that. Sure, the men will get separated from the boys. And some of us who have gotten pretty flabby in the past twelve years will have to flex those sales muscles.

★ ★ ★

But, gentlemen, no one has moved the market. It is still there, a vast thing made up of millions of people called customers with "wants." From the standpoint of number of customers, then, the market is better than it ever has been. We are smack in the middle of a population boom that shows no signs of simmering down. This baby boom has confounded the economic experts year after year. Early marriages and high wages have combined to encourage today's larger families. Naturally, the June moon, certain perfumes, the stars and home television have been in on the scheme.

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By 1975, for example, we will set a "fifth plate" for every four persons now sitting down to the dinner table. This requires increased cattle production. To supply this much food, every five acres of land must produce as much as six acres today—creating a tremendous demand for more tractors, fertilizers, soil conditioners, farm fence, baling wire, poultry netting and hundreds of other farm products. Millions of new houses, (all-steel homes, by the way) telephones, appliances and autos as well as more schools, railroad passenger cars and freight carriers will be needed.

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Also, the demand for electric power is zooming so that our nation's utilities expect to build as much new capacity in the next decade as in the past 75 years.

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A few weeks ago our government made an announcement that nearly got lost among the want ads. Arthur Godfrey and his friends, or lack of same, commandeered the front pages. The United States has started a major plant to develop electric power by atomic energy. This first large-scale, peaceful use of this awesome force can only be the precursor of even greater contributions to our lives. Harnessing this kind of power to peaceful chores could make our present standard of living seem like stone age savagery.

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As for the automobile industry, in seven years there will be 10 million more customers of car-buying age (over 19). In addition, it is highly probable that those super-salesmen from Detroit will talk us all into two cars for every family—and probably next year. This means, as you well know, more roads, super highways and bridges and sales of more concrete and reinforcing mesh.

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In short, our high-powered production of '53 will be far too small for a 1960 population. And, when in the next ten or twenty years the babies of our current baby boom reach marrying age there is likely to be another population explosion to make this one look tiny by comparison. It may not sound very romantic to call an increasing population an explosion, but it sure adds up to a boom for business.

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Of even more significance, perhaps, than the number of customers crowding the market is the bulge in Mr. Customer's pocketbook. In a talk in Detroit, Benjamin F. Fairless, our chairman of the board for United States Steel Corporation, pointed this out. He said:

"Today more people have jobs in America than ever before in our history —about 63-½ million of them, in fact. They are also getting the highest wages in history. Personal income of the American people as a whole stands at an all-time peak. They are spending more money than ever before; and in spite of all they are spending, they still managed to save the fabulous sum of 17 billion dollars last year."

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With that amount of money jingling in the nation's piggy banks there remains only one aspect of the market to consider. That is, the customer's wants. Ted Lewis used to say, "Is everybody happy?" I doubt if everybody ever was, completely; and, unless human nature has been rudely reversed, I doubt if everybody is ever satisfied, either. Do you think people are today? Has your wife coyly pointed out a gaily colored ad in one of the slick ladies' journals to you lately? Looked kinda' wistful at you, too, didn't she?

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What it boils down to for '54 is Mr. Customer and his wants. I have heard it said that this consumer guy is the key to our economic health. Certainly he is, but to use a crazy, mixed up metaphor all keys have to be fitted to the lock and turned in order to open the door. The man to do this unlocking job is the salesman. For the steel industry, therefore, our maximum effort will be directed at selling steel. At United States Steel Supply we want our salesmen rugged and ready for this competitive period.

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Naturally, we don't expect the path ahead to be sprinkled with rose petals but neither are we discouraged. There will be plenty of tough competition. Since there is and will be more steel readily available, we are going to have to work harder to sell it. But steel is going to be sold.

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For the sellers it means sticking to a strict training schedule with regular workouts in initiative, imagination and resourcefulness. Above all, it means we will reemphasize the important philosophy of service to the customer. For the customers it means quicker deliveries, better steel products and more information. America was built on this kind of a market: a buyer's market.

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A buyer's market in steel is something that we've been anticipating for so long some of us are a little nervous about it. We've even forgotten that it is a time-honored, normal and natural condition in the steel industry. But some of us have seemed a little shocked that it should actually become a reality again.

(*Please turn to page* 103)

The Annual Convention of the Wire Association

by Edmund D. Sickels, Editor
Wire and Wire Products
Stamford, Connecticut

Our genial president, Mr. Crewe, remarked at the meeting of the Board of Directors that the Program Committee always wonders each year how it can possibly excel the fine program of the preceding year.

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But such in fact proved to be the case in 1953, when members and guests of The Wire Association convened for its 24th Annual Convention in Chicago at the LaSalle Hotel from November 9th through the 12th. Top-flight technical and production men from wire processing concerns and supplier firms presented a program of papers that were unsurpassed for general level of excellence.

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The registration on Monday, November 9th, broke all records, 390 persons having enrolled for the sessions. A final count of the total registration at the close of the Convention revealed a total of 657, a tradition-shattering high—some 30 more than last year.

The Program Committee

The individuals responsible for the papers and other Convention activities were as follows:

General Chairman: Tom M. Girdler, Jr., Assistant Manager of Operations, Union Drawn Steel Division, Republic Steel Corporation, Massillon, Ohio.

Chairman, Ferrous Program Committee: John L. Sanderson, Superintendent, Wire Mills, Keystone Steel and Wire Co., Peoria, Illinois.

Committee Members: Bruce W. Siemon, Standard Industrial Compounds Co., Chicago, Illinois.

As a part of the permanent record of the history of The Wire Association's activities, this story of the annual Convention is published each year. It also serves to provide those who were unable to attend with an overall picture of this high-spot in the Association's several meetings—The Annual Convention.

Leonard C. Crewe, Jr.
President, The Wire Association * * *

Edgar T. Miller, Supervisor Wire Die Sales, Firth-Sterling, Inc., Pittsburgh, Pa.

Ray S. Worth, Mfr. Mgr., Wire Mills Division, John A. Roebling's Sons Corp., Trenton, New Jersey.

C. H. Williams, Jr., Superintendent, Wire Mills, Pittsburgh Steel Company, Monessen, Penna.

Chairman, Non-Ferrous Program Committee: William L. Wells, Sales Engineer, Reilly-Whiteman-Walton Co., Conshohocken, Penna.

Committee Members: James E. Flood, Chief Chemist, Plastic Wire and Cable Corp., Jewitt City, Conn.

Sidney Rolle, Asst. Manager, The Scomet Company, New York, N. Y.

Leslie C. Whitney, Chief Met., Copperweld Steel Corp., Glassport, Penna.

Grayson B. Wood, Jr., Metallurgist, Scovill Manufacturing Co., Waterbury, Conn.

General Activities: Richard E. Brown, Executive Secretary, The Wire Association, Stamford, Conn.

Registration: R. S. Spengel, Asst. Executive Secretary, The Wire Association, Stamford, Conn.

Entertainment: Eber J. Hubbard, President, Hubbard Spool Company, Garrett, Ind.

The Directors Meeting and Luncheon

The annual meeting of the Board was called to order by **Leonard C. Crewe, Jr.**, President of The Wire Association, at 10:30 A.M., November 10th.

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The terms of Directors Crewe, McGowan, Peterson, Sirois and Voigtlander having expired on November 1st, the Nominating Committee proposed the re-election of all, with the exception of Curtis Voigtlander, who had requested that his candidacy be dropped, which resulted in the nomination of **Earl R. Potter,** President and General Manager of Industrial Wire Products Corporation, Los Angeles, to replace him. All were seated by unanimous vote.

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Mr. Crewe read a telegram from **Mr. P. Thirkell Cox,** Director of the **British Steel Wire Industries Association,** extending friendly greetings and best wishes for a "best-ever" Convention.

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Reports on the Convention program were made by the General Chairman, the Ferrous and Non-

Ferrous Division Chairman, and the Entertainment Committee Chairman. Mr. Crewe expressed the appreciation of the Board to these men and their committeemen for their excellent work.

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The Mordica Memorial Lecture Committee Chairman, **Fred M. Crapo,** reported that a lecture for 1954 had been selected, but not confirmed. The announcement, he said, could probably be made very shortly. At the Annual Luncheon he advised that acceptance of the honor of delivering the lecture had been received and that **Carl E. Johnson,** Superintendent of Rod and Wire Mills of the Bethlehem Steel Company at Sparrows Point, Maryland, could serve in this capacity.

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Allan B. Dove was appointed to the chairmanship of the Medal Award Committee and **David M. Schmid** and **William L. Wells** added to replace two whose terms had expired.

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The Nominating Committee's report was given by **John L. Sanderson** on new offices for the coming year. These were; President: **L. C. Crewe, Jr.;** Vice President, Ferrous Division: **Leslie C. Whitney;** Vice President, Non-Ferrous Division: **Ralph B. Roth;** and Executive Secretary: **Richard E. Brown.** The Board accepted the slate and unanimously elected the nominees.

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Mr. Sanderson also presented the names of **Fred M. Crapo, L. C. Crewe, Jr., Tom M. Girdler, Jr., Ralph B. Roth, Benoit J. Sirois** and **Richard E. Brown** to serve on the Executive Committee. By vote of the Board these gentlemen were elected.

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A. Earle Glen reported on plans for the program at the Convention to be held in Detroit in 1954 from November 8th through the 11th. Plant visitations were discussed with approval going to tours of the Carboloy plant in the morning and the Ford Motor Company's plant in the afternoon.

Tom M. Girdler, Jr.
General Chairman, Program Committee

Robert C. Peterson described the plans for a two-day regional meeting in Worcester on April 22 and 23, 1954, with plant visits to C. F. and I's Wickwire-Spencer, Palmer, Works, and the Electric Cable Works of A. S. & W. in Worcester.

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William L. Wells discussed the next Non-Ferrous Division meeting and suggested that it be held in Providence, R. I., in September. This was authorized.

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After the adjournment of the meeting, the Directors entertained the program participants, members of the committees and the speakers, at a cocktail party and luncheon, following which President Crewe expressed his appreciation of the work done by the gentlemen in preparation for this Convention.

2 P. M., Monday, November 9th
Joint Technical Session

While all other sessions of the Ferrous and Non-Ferrous Divisions are held separately and simultaneously, the opening meeting was comprised of three papers of interest to both groups.

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President Crewe formally opened the Convention with an address of welcome to the members and guests in attendance, following which he turned the meeting over to **Bruce W. Siemon,** Chairman of the Meeting.

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Three excellent papers were presented. The first was entitled "Quality: the Key to Economical Use of Diamond Abrasives" by **C. Randolph Myer,** Manager Abrasives Division, Elgin National Watch Company, Elgin, Ill. The second was on "A Nickel-Free Austenitic Steel for High Strength Wire" by **H. O. McIntire,** Res. Eng., Battelle Memorial Institute, Columbus, Ohio, of which **G. K. Manning** of the Institute was co-author. A final paper: "Components of Wire Drawing Lubricants" was given by **Leon Salz,** Manager Lubricants Division, Magnus Chemical Co., Garwood, New Jersey.

Technical Sessions 9:30 A.M., Tuesday, November 10th
Ferrous Division

This session was a symposium on "The Progress of Mechanical Descaling of Rods for Wire Drawing," for which **Edgar T. Miller,** Manager Wire Die Sales, Firth-Sterling, Inc., Pittsburgh, Pa., served as chairman, with panel members, each a specialist on some phase of the subject, as follows:

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George Fecson, Die Room Foreman, Pittsburgh Steel Company, Monessen, Pa.; **Arthur Hedman,** Die Room Foreman, Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp., Palmer, Mass.; **Allyn E. Harper,** Chief Engineer, Oliver Iron & Steel Company Pittsburgh, Pa., **H. J. Godfrey,** Asst. Chief Engineer, Development and Research, John A. Roebling's Sons Corp., Trenton, N. J.; **Walter A. Smigel,** General Manager, R. H. Miller Company, Homer, N. Y.; **C. F. Wickwire,** Vice President, Wickwire Brothers, Inc., Cortland, N. Y.; **S. L. Stalson,** Research Project Eng., American Steel & Wire Division, United States Steel Corp., Cleveland, Ohio.

Non-Ferrous Division

Grayson B. Wood, Jr. occupied the chair for this session. Papers and their authors were as follows:

"Manufacture of Rivets and Screws," by **T. L. Merriman,** Metal-

lurgist, Scovill Manufacturing Company, Waterbury, Conn.; "Processing of Phospher Bronze Wire," by **Earle W. Lovering,** Asst. Wks. Mgr., Seymour Manufacturing Company, Seymour, Conn.; and "Twisted Paper's Role in the Wire Industry," by **W. Garwood Bacon, Jr.,** Sales Manager, E. W. Twitchell, Inc., Philadelphia, Pa.

2 P.M., Tuesday, November 10th Ferrous Division

For this section **Ray S. Worth** introduced the speakers and acted as chairman. The three papers were:

"The Drawing of Shaped Steel Wire," by **Vito J. Vitelli,** Process Eng. Steel Wire Mill Division, John A. Roebling's Sons Corp., Trenton, N. J.; "Continuous Annealling with Carbon Restoration of Coils and Bars," by **J. D. Armour,** Chf. Met. Union Drawn Steel Div., Republic Steel Corp., Massillon Ohio; and "Rod and Wire Quality vs Cold Heading Quality," by **W. E. Hill, Jr.,** Plant Supt. Russell, Burdsall & Ward Bolt and Nut Company, Rock Falls, Ill.

Non-Ferrous Division

With James E. Flood in the chair, this session was composed of three papers as follows:

"Rural Distribution Wire," by **C. C. Lawson,** Wire Develop. Eng., Bell Telephone Laboratories, Murray Hill, N. J.; "The Use of Neoprene in the Wire Industry" given by **C. E. McCormack,** Rubber Chemicals Div., E. I. du Pont de Nemours & Co., Wilmington, Del., who had been assisted in its preparation by **R. H. Baker** of the same company; and "A Review of Fluorothene in the Wire and Cable Industry" presented by **F. W. Wurtzell** Dev. Eng., Bakelite Company, New York, N. Y., and coauthored by **W. J. Canavan** and **B. H. Maddock** of the Bakelite Company.

9:30 A.M., Wednesday, November 11th Ferrous Division

C. H. Williams, Supt. Wire Mills, Pittsburgh Steel Co., Monessen, Pa., acted as chairman for this session. The papers were:

"Handling and Storing of Wire and Wire Products," by **C. C. Tappero,** Supt. Wire Mills, Colorado Fuel & Iron Corp., Pueblo, Colo.; "The Foreman's Function with Regard to Methods of Controlling Quality," by **M. G. Boyd,** Asst. West Mill Supt., Steel Company of Canada, Ltd., Hamilton, Ont., Canada; and "Production and Quality Control Plus Mill Information—Sales Department Musts," by **Eugene K. Wright,** Sales Mgr. Manufacturers' Division, Continental Steel Corp., Kokomo, Ind.

Non-Ferrous Division

Leslie C. Whitney conducted the final Non-Ferrous session, which embraced papers as follows:

"Results of Research on Insulated Wire," by **Dr. John T. Blake,** Dir. of Research, Simplex Insulated Wire & Cable Company, Cambridge, Mass.; "Electrical Motors and Control for Slip Type Wire Drawing Machines," by **H. A. Dickerson,** Application and Project Engineer, Control Engineering Department, Westinghouse Electric Corp., Buffalo, New York; and "The Properzi Process for Continuous Casting and Rolling of Aluminum Redraw Rod," by **Frank R. Nichols,** President, Nichols Wire & Aluminum Company, Davenport, Iowa.

Following the delivery of the paper Mr. Ilario Properzi president of S. p. A. Continuus, Milan, Italy, inventor of the process, gave a short talk, a translation of which was given by Mr. Nichols.

The Annual Luncheon

At one o'clock on Wednesday, November 11th, approximately two hundred members and guests, including the ladies who had accompanied men to the Convention, gathered in the ballroom for the Annual Luncheon. After the luncheon. President Crewe extended a welcome to the assemblage and then presented a Tiffany bronze plaque, the Annual Medal Award, to **Howard J. Godfrey,** Assistant Chief Engineer of the De-

Picture taken at the 1953 Annual Luncheon of The Wire Association in Chicago.

velopment and Research Division of John A. Roebling's Sons Corporation for the most meritorious paper presented at an Association Meeting in 1952: "The Significance of the Elongation Test on Wire." Mr. Godfrey responded graciously in a brief acceptance of the honor bestowed upon him.

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Leslie C. Whitney, Vice President, Ferrous Division, then presented certificates of honorable mention to **Jere Y. Heisler,** Assistant General Foreman, Wire Drawing, of the Bethlehem Steel Company at Sparrows Point, for his excellent paper: "Improved Lime Bath Performance by Recirculation," following which **Ralph B. Roth,** Vice President, Non-Ferrous Division, presented certificates of honorable mention for the fine paper jointly written by **Edward P. Hall,** Metallurgist, Kenicott Wire and Cable Company and **Robert D. Peck,** District Engineer, Industrial Products Div., Johns-Manville Sales Corporation, for their paper: "Development of New Asbestos Insulated Magnet Wire."

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Our guest speaker was **L. B. Worthington,** President of the U. S. Steel Supply Division, United States Steel Corporation, who addressed the group in a talk entitled "Target for 1954." He presented a most encouraging picture of our future, his talk being reproduced in full in the January, 1954, issue of Wire and Wire Products.

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The piece-de-resistance of the after dinner talk was the Mordica Memorial Lecture, prepared and to have been delivered by **Charles D. Johnson,** former president of the Johnson Steel & Wire Company in Worcester, Massachusetts. Due to illness, Mr. Johnson had wired the day before that on doctor's orders, he could not be present. His lecture, entitled, "Reminiscings of an Old Timer," was very ably delivered by George E. Seeley, Vice President of the Maryland Fine and Specialty Wire Company of Cockeysville, Maryland. Mr. Seeley, a close friend and former associate of Mr. Johnson, due to his intimate knowledge of Mr. Johnson's ways, gave the lecture with a feeling that did both him and its author considerable credit.

"HANDS ACROSS THE BORDER"
Left to right. Charles D. Gill, Fred M. Crapo, Leslie B. Worthington, Tom M. Girdler, Jr., Ralph B. Roth, Sardar B. Singh, Leslie C. Whitney and Leonard C. Crewe, Jr. * * *

The Annual Meeting of Members of the Wire Association

This opportunity for members to secure first hand reports on the doings of their officers and to present their ideas on how the affairs of the Association should be run, was called to order at 4 P.M., on November 11th.

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After reports by the Secretary-Treasurer, **Richard E. Brown,** announcements were made by President Crewe of the newly elected officers and directors and the changes made in the several committees. It was announced that **Carl E. Johnson** had been selected to deliver the Mordica Memorial Lecture in 1954 in Detroit, on the occasion of the Association's Silver Jubilee Convention.

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Plans for the several regional meetings and the Annual Convention in 1954 were also presented and discussed.

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After recording a ratification of the acts of the officers and directors in 1953 and a vote of thanks to the Program Committee for its work on this Convention, the meeting was adjourned.

The Stag Smoker-Dinner

More than a "full-house" attended this convivial annual feature affair. 560 tickets to the banquet were sold, as well as some 20 "half-tickets," entitling holders to the privileges of the bar and to come in to see the show after the banquet.

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The bar opened at 6 P. M., with dinner starting at 7 P. M. Following the banquet, a really "tops" show was staged, lasting approximately two and a half hours. This show was one of the finest and cleverest it has been our good fortune to enjoy and full credit goes to **Eber J. Hubbard,** Chairman of the Entertainment Committee for his excellent taste and, incidently, much hard work in selecting and putting the acts together in a pleasing and entertaining series.

Thursday, November 12th
The Plant Inspection Tours

This day was entirely devoted to plant inspection trips. The first trips were started out at 8 A. M., with the Ferrous members going to Republic Steel Corporations, Rod and Wire Mills in their South Chicago Works, and the Non-Ferrous Convention members taking busses for Western Electric Company's Hawthorne Works. In the afternoon, a second group of Non-Ferrous men also went to Western Electric's plant.

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At both plants the visitors saw many improvements and additions that had been made since our last visits to them many years ago. The officers and directors of the Association are deeply grateful to these plants respective managements for their courtesy and kindness in opening their plants to our members.

Conclusion

The story of the Convention would not be complete without reference to the fact that we were honored by the presence of members from every part of the globe. Besides the usual large group from Canada, men from England, Mexico, India, Puerto Rico, Italy, Australia, Belgium and Japan were in attendance. We are always

(*Please turn to page* 104)

Specials!

In addition to a complete line of standard wire drawing and bar drawing machines, Ajax designs and manufactures special drawers to meet a wide variety of special requirements. Whether the need is for round, square, hex., keystone or rectangular section stock to close tolerances or whether the drawer is to be used in conjunction with cold headers, presses or special machines, Ajax can build it to meet the requirements and at a cost consistently low for the size and quality of the machine produced. If you have a need for drawing ferrous metals from 1010 to 52100 or non-ferrous metals with enough hardness to permit gripping, which is beyond the range of one of our standard drawers our engineers will be glad to discuss your particular requirement with you. We will be glad to send further information.

A Bar Drawing and Straightening Machine

B Drawing, Straightening and Cutting off Machine

C for Drawing Keystone Stock

D for large Waterbury-Farrel Nut Machine

E for ½" Nut Machine

F for ¼" Hi-Pro Header

G for ⅜" Hi-Pro Header

H for No. 5½ Minister Press

I for Double End Spoke Header

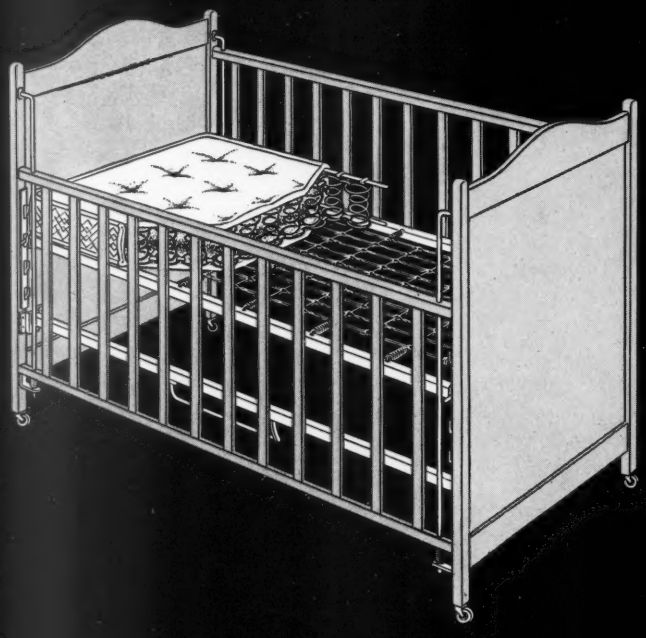
J Continuous Drawing Machine

K for ⅝" Bolt Maker

THE Ajax MANUFACTURING COMPANY
EUCLID BRANCH P. O. CLEVELAND 17, OHIO
110 S. DEARBORN ST. CHICAGO 3, ILLINOIS
DEWART BUILDING NEW LONDON, CONN.

One thing in common...

ALL USE



Oil Tempered
MB Spring Wire

Hard Drawn MB Spring Wire

Picture Cord Wire

Shaft Wire

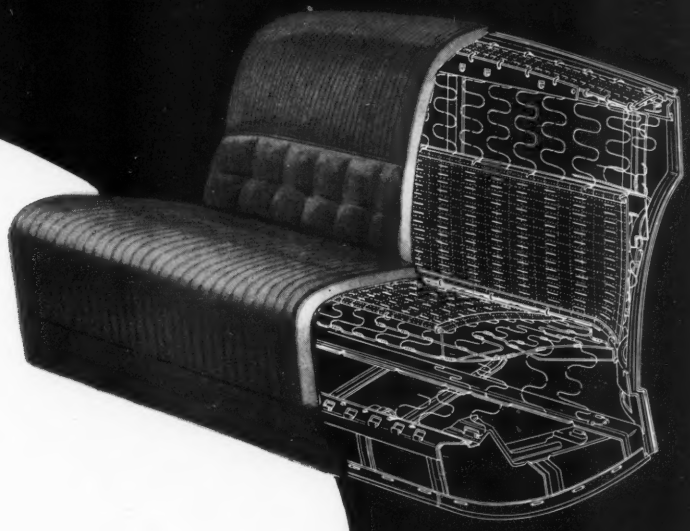
Spheroidized Wire

Clip Wire

Brush Wire

2054

WICKWIRE WIRE



The products illustrated in our recent series of advertisements run the gamut of variety —from cribs to umbrellas; from automobiles to living room furniture. One thing they have in common, however—they all use Wickwire Wire.

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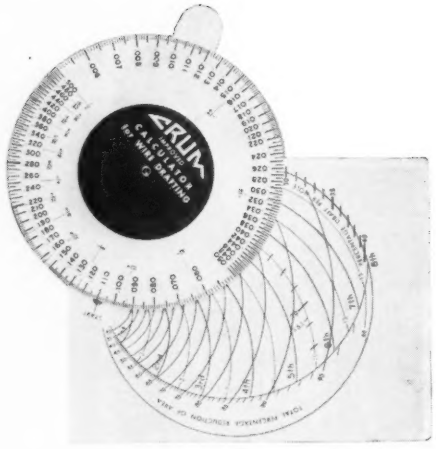

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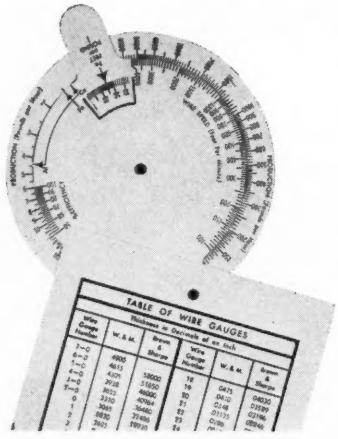

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Wire Association Proceedings

Discussions of Papers Presented at the Annual Convention of The Wire Association at Chicago, Illinois, November 9-12, 1953

JOINT SESSION, FERROUS AND NON-FERROUS DIVISIONS
MONDAY, NOVEMBER 9th

The Joint Technical Meeting of the Ferrous and Non-Ferrous Divisions convened at two o'clock Chicago with Bruce W. Siemon presiding.

Chairman Siemon: One of the most pleasant duties of being the Chairman of the opening session of this meeting is the fact that it's an honor and privilege to introduce the President of The Wire Association. Having known him for a long time, I have grown to respect him. You have got to get up early to beat him and to run like heck to keep up with him.

I think that while I am ahead I will quit and will just introduce to you the President of the Wire Association, Mr. Crewe. (Applause)

President Crewe: Mr. Chairman, members of The Wire Association and Guests: This chairman that you have is quite an introducer. He certainly introduced me to some very interesting mixtures last night. (Laughter)

We are now officially opening the 24th Annual Wire Association Convention, the first one having been held in 1930.

It is my distinct honor and pleasure, if you please, to extend to you the greetings and the welcome of your Officers and Directors.

We have had four most successful regional meetings during the year and our membership has passed a goal that we would hardly have dreamed of years ago. It is now officially at 1028.

The registration for this meeting has set an all-time record, something over six hundred. This includes friends from the allied countries of Canada, Mexico, England, India, Italy, Australia and, I understand, Puerto Rico.

The health of the Association apparently was never better.

Your General Program Chairman, Tom Girdler, together with his two assistants, John Sanderson and Bill Wells, have arranged for your pleasure two wonderful technical programs. They have also planned a trip to the rod and wire mill of Republic Steel on Thursday morning, and also trips to Western Electric on both Thursday morning and Thursday afternoon. You are all cordially invited and urged to make these trips.

In the business field there has been a bit of concern about operations. We hear of cutbacks of as much as thirty-five to fifty per cent. However, knowing the Wire people as I do, the initiative that they have, I feel sure that this is only a temporary condition. I know of a great many conditions in the Wire industry where they are now adjusting themselves to meet our good old competition and this has never hurt anybody.

Probably the greatest gains that we will make in the next few years—possibly in the next decade—will be in the form of human engineering. The more we know about human engineering, the more we realize there is yet to be learned, and never were our opportunities greater to progress along this line than today.

This Association has long since proven wrong the philosopher who said, "He who tells does not know and he who knows does not tell." That is not the case here.

The great advantages that come out of these meetings are the wide open discussions that follow prepared papers. Make the most of them and enter into them.

Again, gentlemen, it is a pleasure to welcome you here today. (Applause)

Chairman Siemon: We are going to attempt something new in the line of the discussion to be held at this meeting. Mr. Sanderson is the father of the idea and I concur with it.

In addition to discussion from the floor which we will call for at the conclusion of the final paper, we will ask you to write your questions. You will notice here and there about the room little pads of paper. We ask that those who are a bit reluctant to get up on the floor to write their questions on the paper provided and then they will be picked up and presented up here. We will ask that you address your question to the particular individual that delivered the paper. We also ask that you sign it. We will collect these questions at the end of each paper so that the author of the paper will have the chance to prepare a good discussion of your question. The reason that we ask you to sign it is that we normally require clearance for publication and we want to know who to clear it with.

I am going to ask Morris Boyd and Bob Stephens to assist in the collection of the questions at the end of each paper. They will bring them up here and we will give them to the particular author and let him prepare his discussion.

We will now get on with the first paper of the session. The title of the paper is, "Quality, the Key to Economical Use of Diamond Abrasives." This paper has been prepared by C. Randolph Myer, Manager, Abrasives Division, Elgin National Watch Co., Elgin, Illinois.

Mr. Myer was born on June 6, 1921 in Elizabeth, New Jersey. He was educated in New Jersey, graduating from Princeton University with a B.S. degree in Aeronautical Engineering. He went directly from college to the Naval Air Corps. After overseas service he was discharged as a Lieutenant. He spent two years with United Air Lines in Chicago doing labor relations work. He went with the Elgin National Watch Company in 1948 as Sales Engineer and was made Division Manager in 1951. He is married, has two sons and lives in Geneva, Illinois.

I present Mr. C. R. Myer. (Applause)

(Mr. Myer then presented his prepared paper entitled "Quality, the Key to Economical Use of Diamond Abrasives.) (Applause)

Chairman Siemon: Thank you, Randy, for a very interesting paper.

I am going to ask the two gentlemen whom I appointed to collect any questions that you may have written down. Please do not hesitate to get some questions down on paper. Of course, we also intend to have a discussion from the floor but this is to help those who may be a bit reluctant in getting to their feet.

I believe that our next paper this afternoon will be a highly informative paper, particularly for those who handle high alloy grades, particularly stainless.

This paper has been prepared by Mr. H. O. McIntire, Assistant Chief Engineer and G. K. Manning of the Battelle Memorial Institute, Columbus, Ohio.

This paper will be presented by Mr. McIntire. (Applause)

(Mr. H. O. McIntire then presented a prepared paper entitled, "A Nickel-Free Austenitic Steel for High Strength Wire.") (Applause)

Chairman Siemon: I would like to thank Mr. McIntire for the presentation of that paper.

Now, if the two gentlemen whom I appointed will get busy, we can collect your questions and bring them up here. I see some faces in here who I recognize as being actively interested in this field. I hope that they will feel free to present some questions upon the conclusion of the next paper. This is an interesting subject to me. At one time I was associated with stainless steel and so I have a question or two that I would like to ask.

Our concluding paper this afternoon is going to be delivered by Mr. Leon Salz, Manager, Lubricants Division, Magnus Chemical Company, Inc. of Garwood, New Jersey.

Mr. Salz was graduated in 1940 from New York University with a degree of B.S. in Chemistry and from the University of Michigan in 1941 with an M.S. in Chemistry, after which he took specialized training at the Polytechnic Institute of Brooklyn in lubricants. After two years with the Crane Packing Co., Chicago, he went with the Socony-Vacuum Laboratories in Brooklyn, becoming Senior Chemist. In 1949 he joined the Magnus Chemical Company and was shortly thereafter elevated to his present post. He holds a number of lubricant patents and has written several technical articles on the subject.

Mr. Salz is a member of The Wire Association, The American Chemical Society and the American Society of Lubricating Engineers.

I present to you, Mr. Leon Salz. (Applause)

(Mr. Salz then read his prepared paper entitled, "Components of Wire Drawing Lubricants.") (Applause)

Chairman Siemon: I wonder if the three authors will now join me up here and we will open up the discussion.

I am going to ask that in the discussion and questions from the floor, that you address your question to the person whom you desire to have answer it and that before you give your question that you preface it by giving your name and company affiliation.

While I am waiting for you to get warmed up I will ask one myself and this is directed to Mr. McIntire.

I am particularly interested in that new alloy. In the annealing that you mentioned, do you normally follow that with a fairly rapid quench.

Mr. McIntire: Yes, we did use a quench. I don't think it is absolutely necessary in small diameters but it does aid in removing the scale and therefore I think it would be desirable in the stainless steel.

Chairman Siemon: Are your pickling practice procedures essentially the same as you would use for the 302 and 304 series?

Mr. McIntire: I have a written question asking the same thing.

In the laboratory we use seven per cent sulphuric acid at about 180° F. It did develop a brown smudge which, under some circumstances was difficult to remove. In the flush dip in the laboratory we used a fifty per cent nitric acid solution but commercially I would not use that.

On the lot processed in the commercial mill the standard procedure for type 302 was used and that was a little difficult with this brown smudge but by shortening the nitric acid dip we were able to overcome this difficulty.

Chairman Siemon: Do you have another question there?

Mr. McIntire: A member asks, "What useful purpose does silicon serve in this Alloy—is it necessary?"

Well, the silicon to a small degree can replace chromium. Silicon is cheap and therefore silicon should be used to the major extent that it can be used. Then too, another one per cent of silicon will probably add more in corrosion resistance and for that reason it would be desirable to keep up the silicon possibly one per cent.

Chairman Siemon: Are there any further questions from the floor on that subject?

A Member: You stated that tensile and magnetism decrease with increasing manganese and increasing carbon plus nitrogen. How about increasing carbon without nitrogen—would the effect be the same?

Mr. McIntire: From the relatively small amount of data that we have obtained we think that carbon and nitrogen are about the same in maintaining an austenitic structure and also in keeping the tensile strength down. However, we do feel that perhaps you can get a little more of it combined if you use both rather than just one. For that reason I think it would be desirable to use both carbon and nitrogen.

Chairman Siemon: I have an interesting question. What does a magnet gage measure? What are you measuring in that?

Mr. McIntire: Actually the gage itself consists of a small magnet and it has a spring attached to it. It is a very fine spring and the thing that you measure is the ability of the material to be magnetized. In other words, the thing that you measure is the force required to pull a magnet from the wire.

Chairman Siemon: Leon, do you have some written questions there?

Mr. Salz: Yes, I do.

"Are you able to give some information as to the effect of lubricants due to the various ingredients in the compound?"

Well, that is a subject on which I travel all over the country discussing. We always explain to people that the cost of the lubricant represents a minor cost to the total operation and that the most efficient and effective lubricant should be used. Of course, as to cost, it is obvious that the real high cost is the cost of the overhead, the cost of the dies and the cost of the rejected wire.

Now, if one were trying to get maximum efficient results in the drawing of stainless steel wire, it would be foolhardy to use a sodium type soap. The only justification for using the sodium soap would be in cleaning and the problems associated with it.

Mr. Salz: A question asks about the importance of the melting points of soaps.

This is very important. The selection of a soap for drawing a certain grade of wire should be such that melting will not occur.

Those that you do not mix with water are certainly more efficient than the wet types. When the soap melts then you are in the wet category.

Also, when soap melts you will have a cake or solid form there and the chance is that you will have very little lubricant between the die and the wire. If your soap melts, you are going to have a very poor die life.

Chairman Siemon: Randy, what do you have?

Mr. Myer: Bruce, I have a few here. I will take an easy one first because the answer is one that I do not know. (Laughter)

This question says, "Do you have any idea of the quantity of Boron Carbide used by the wire drawing industry annually. Also, what are the extremes in grid sizes used?"

Possibly I should qualify my negative answer by saying that frankly I don't have any idea at all how much Boron Carbide is being used annually in the industry but on the grid sizes, to the best of my knowledge, it can vary all the way from a twenty grid to a nine hundred grid. I think that the general range, and the one most commonly used, is from 120 to possibly a 600 grid. However, Boron Carbide is most effective in the grid sizes from 20 to 900. Beyond that it loses a lot of its cutting qualities.

Chairman Siemon: Go right ahead with the other questions, if you will.

Mr. Myer: There are two or three questions which are right along the same line. Possibly I can cover several of them at a time.

One question asks, "Do you find differences in diamond abrasives from various areas, South American countries and so forth?

Well, diamond has about the broadest range of hardness variation of any of our common abrasives. In other words, on that chart it showed a hardness from 6500 to 8500, which is about a 33 per cent variation. Most of the others are of a much narrower variety.

I am not sufficiently informed on the diamonds from various areas to say specifically why, but my assumption is that we all know that there are certain types of diamonds from certain areas which are better. There are harder and stronger stones, let's say, from South Africa or South America, as opposed to the Congo Region. Supposedly, the Congo Region is the poorest of all of them.

However, you do get a degree of variation and this results in variations in your die stones. In other words, it results in a difference of the number of feet of wire that you will get from the stones of these different areas.

Now, when it comes to diamond abrasives and the difference of efficiency in the abrasives from various areas, let's face it—you do make the most that you can of the material that you have there. Therefore, the variations from areas that you would get in your diamond would probably not show up in your processing as too great a variable.

The next question is, "What about the reclaiming of used diamond abrasives—what is the per cent of recovery?"

I think that all of you who have dealt with diamonds are familiar with it. Of course, I think that it behooves all of you, when some of these materials are in short supply or to be used for critical efforts, to save as much as you can of them—which means the reclaiming of your material.

Of course, reclaiming can vary all over the lot depending upon the efficiency of the operation. We have tested in our own plant materials from our own operations and materials sent in to us. The reclaim value will run anywhere from one tenth of one per cent of the bulk material up to eighty per cent of the material and your variable comes from the efficiency of the process in which the diamond was used.

I would certainly recommend that you reclaim as much of your diamond as is economically possible. Obviously, if you have one tenth of one per cent, then you spent more in labor to get the diamond back than it is worth on the market.

We are in the middle of a research project on this very thing right now. It looks as though the average efficiency of reclaimed diamond is about 75 per

cent of the virgin material. However, that can run all the way up to one hundred per cent, depending on efficiency of operation.

The next question is, "Describe in brief how long the floatation process of grading takes. Also, how is the material which settles drawn off?"

On settling time, that runs anywhere from a matter of split minutes to days. Obviously your large particles are going to fall like rocks in water. Where you get your very fine particles, say half a micron, it is going to take a good and long time for that material to settle. When you get down into that area you run into movement and you find that the particles act on one another and they tend to keep one another in suspension.

I can't answer the question specifically, for it depends on what you are settling.

How is the water drawn off when the powder settles? Obviously by suction. Once all of the powder has settled to the bottom, then you have reasonably clear water on the top. This is then drawn off by suction and it leaves a moist cake on the bottom and the balance of the water is removed by heat.

"What is your opinion of the cutting qualities of diamond powder that has been reclaimed from sludge and cotton waste?"

It basically depends upon the efficiency of operation from which the diamond came and I am all for reclaiming material.

"What is the comparison dollar-wise and production-wise between the use of virgin diamond or the use of cracked diamond dies that have been removed from their casings, crushed, and graded?"

Without any factual information to back me up I would vote for diamond dies. Generally your tool stones and die stones come from your better diamond-bearing areas—South America, South Africa and West Africa.

I think that we would probably find, if we could test materials of that nature, that they run on the high side of the hardness scale. Therefore the harder they are, the better the abrasives they would produce.

"Does the diamond lose any of its working strength due to its use in drawing wire previous to being crushed and used for lapping, etc.?"

In our opinion the answer is "No." Basically, as you know, diamond is a form of carbon and heat and other factors might effect the diamond. You cannot heat treat diamonds and so I would give a negative answer there.

"You mentioned aluminum oxide as a possible contaminant in diamond powder. Are other mineral powders likely to be found? If so can you indicate what these are?"

Possibly I talked too much about aluminum oxide. You also could have silicon carbide in there, which, to all intents and purposes would look the same as aluminum oxide—a white powder. The only way you could show that up would be by defracting the light through particles. There are other impurities that are found in diamonds. Generally the impurities found in diamond powder are aluminum oxide of the silicon carbide variety.

A Member: Taking a hypothetical case of a die room that might use a hundred carats of powder a month on diamond dies and working diamond dies—what percentage of over-all recovery would you think would be a reasonable figure? You gave us a figure for recovery from sludge. I am talking about the recovery of the stuff that we originally buy. Do you have any figures or any idea what an efficient die room would recover?

Mr. Myer: There is one point that you reminded me of there and that is about reclaiming. Let's say that in your process you use two or three grades of dies, whether they be diamond or otherwise. Obviously they are going to break down so that when they are reclaimed and regraded you are going to come back with grades that are generally finer than you started with.

On the subject of the efficiency of the operation—we find that powders coming from diamond die operations are far more worn out than those coming from tungsten carbide operations.

Again it varies. I would hesitate to give you an answer on it, but I think that you should easily get back in the neighborhood of five to ten per cent of useful powders in the grades that you would use from your original purchase. In other words, on 100 carats that might run from 10 to 25 carats in the useful size range.

A Member: Then what would be the over-all recovery, regardless of size?

Mr. Myer: That might run in the neighborhood of 30 to 40 per cent of your material. Of course, that would depend upon how you save your waste. Where you lose so much of it is in the cleaning process, because you use heat in cleaning and most of the time you oxidize the diamond and that is where a considerable amount is lost.

A Member: How do you obtain the new particles of your diamond—isn't that an indenting process?

Mr. Myer: That's right, with a diamond indenter. It is actually shaped in the form of a double triangle. It is an indentation process.

A Member: Can you do that on the diamond?

Mr. Myer: I am not familiar with that.

A Member: In the reclamation of used powder, is it possible to get it as chemically pure as the virgin powder—in other words, removal of all impurities?

Mr. Myer: I would say "Yes." We get it with the allowable standards—which is two per cent impurity.

That is another factor—the more you process it to get it cleaner, the greater tendency you are going to have to oxidize the diamond and it is going to go off as gas. However, we can get it within the allowable limit.

A Member: Is the method that you have a trade secret or is it available to other people who would like to know what it is?

Mr. Myer: We have not published what we have done. Frankly, we are not in the business of reclaiming, but in the interest of national defense I think that we should be prepared to do it. We have a program developed where we can do it if we want to.

A Member: Are there not a great many disputes about some of the points that you made. For instance, there are many people who would deny that Congo diamonds are softer than others? I wanted to make that point and also to state my belief that you are being unfair to the diamond industry when you say that. Another point is that most powders that are sold by reliable companies are pure powders. I think that you mentioned the possibility of impurities.

Mr. Myer: I am glad that you brought some of those points out.

With regard to the first point, the origin and so on, I have talked to a lot of people and I find that people in the diamond die business, whether they are right or not, seem to know a great deal more about diamonds than about almost any other segment of our industry. What I meant to indicate was that the idea seems to be that Congo diamond is the poorest. I don't mean to be flat-footed in some of these statements for there is a lot of variation in connection with it. I think that diamond technology is just starting to come of age and we will get some of the answers to these questions.

As to the standards, I did not mean to be critical of anybody else. I only wanted to tell you what you should look for when you buy diamonds. Naturally in any industry you will run from very good to very bad and there are many reputable houses.

I was talking in the interest of the amount of money that you gentlemen have to spend. Again I say that a slight investment of three hundred dollars to insure your getting what you pay for is going to put everybody on their mark, and that was the purpose of my talk. A lot of people are price buyers and I certainly do not mean to imply that the lowest price will always buy the worst material, for that does not necessarily follow.

Chairman Siemon: Are there any further questions?

On behalf of those present I would like to thank the authors for their very interesting papers and you in the audience for your very kind attention.

(The meeting recessed at four o'clock, p.m.)

Editor's Note

Symposium on "The Progress of Mechanical Descaling of Rods for Wire Drawing"

The stenographic transcripts of the statements made by panel members and the discussions from the floor on this most interesting subject will have to be published at a later date, because of the delays occasioned by our having to submit the transcripts to panel members for correction and approval. These will appear in an early issue of '54.

NON-FERROUS DIVISION
TUESDAY MORNING SESSION
NOVEMBER 10, 1953

The Non-Ferrous Division convened at nine-forty o'clock, with Grayson B. Wood, Jr., Scovill Manufacturing Company, Waterbury, Connecticut, presiding as the Chairman.

Chairman Wood: I want to welcome all of the visitors and members to this meeting this morning.

Our first speaker this morning has done us a very great favor. The gentleman who was originally scheduled to talk, has found it impossible to organize his talk and get out here this morning, so T. S. Merriman of the Scovill Manufacturing Company of Waterville, Connecticut, has very kindly consented to come out and pinchhit for him.

He is not only pinchhitting, but he is also talking on the same subject that Mr. Caltham was originally supposed to cover. Mr. Merriman is a graduate of the Massachusetts Institute of Technology in 1939. He came to work for Scovill shorty thereafter and has been with them ever since. He is a process engineer and a metallurgist in the Screw and Rivet Division of the Scovill Manufacturing Company.

The talk is to be on manufacture of rivets and screws. Mr. Merriman. (Applause)

Mr. Merriman then presented his paper: "The Manufacture of Rivets and Screws."

Chairman Wood: Thank you, Mr. Merriman.

Now, we will throw the meeting open for questions.

A Member: Has there been any late developments in the production of screw machinery in the way of equipment?

Mr. Merriman: That is a question I am sorry I cannot answer. Tubular rivets are not among our products and I am not familiar with the latest developments of that sort.

A Member: We have been playing with Scovill and other brass manufacturers, trying to get what we hope will be an all-purpose brass for extruding and upsetting and rivet manufacture and so far we have struck a blank. What we are trying to do is to keep from having 17 varieties of tempers for various types of brass manufacturers. What type of copper have you found satisfactory?

Mr. Merriman: We have had adequate facilities for getting wire of any and all tempers and we have tried any and all. We have run the gamut on yellow brass all the way from half number or even dead soft material to 70-30 brass, which is four numbers harder. We have not been able to develop an all-purpose temper. I don't believe there is any such thing because of the variety of products that you make.

Once again I will cite it as a fact that the tendency in our own shop is to go to the harder temper always. We are at the present time using wire slightly less than two number hard as a general purpose wire; when we have a special application, we don't hesitate to specify special wire for the job. It has to be done that way. I indicated the thing can be standardized, simplified, but only to a degree you will always have the exception that will require special temper.

On copper we have even gone occasionally to wire which is six to eight numbers higher and still have been able to upset it successfully. Of course, our purpose there was to give us rather better cutting properties for subsequent secondary operations.

A Member: One other thing, there seems to be a difference in wire specifications, one with one outfit and something else with another outfit. Some of them figure by reduction of area and drawing and others, I don't know what the hell—I haven't been able to find out.

Mr. Merriman: Well, they have rules to cover that sort of thing.

A Member: They make them up as they go along.

Mr. Merriman: Possibly our chairman could put his finger on that one better than I, although in our own shop there is no confusion. Quarter hard or one number is the same wire.

A Member: We sell to the wire industry. We make paper and know nothing about wire, but I would point this out, don't you people work with the ASTM on standards? Aren't their standards set up?

Chairman Wood: Yes, giving the tested strength, not in regard to temper.

A Member: Some of the committees I have attended really go into quite elaborate detail on their task forces to help establish standards.

Mr. Merriman: There is another outfit that does a lot of work on that, the Copper and Brass Research Association. We have had discussions on that with the mill people. We feel any wire producers who can't produce within the CABRA specifications has no place in American business today.

A Member: You said you originally used white lead and oil as a lubricant. What did you go to then?

Mr. Merriman: We have a chemist in the laboratory and he has been working with us on this matter of heading lubrication for about ten years, at least before I went to work, and today we are using a number of lubricants. We have successfully used wax products. We are currently using for some of these on extrusions, a synthetic lubricant put out by Union Carbide. Union Carbide and Chemical Corporation is marketing synthetic lubricants which do a very good job. We use machine oil. We use crude oil. We use grain seed oil, and we have over a period of years tried literally hundreds of lubricants, including silicon greases and very fine graphite dispersions. We have used successfully molybdenum sulphite in a grease base.

In our own experience, molybdenum sulphite, where it can be applied in metallic form does a beautiful job. It seems to lose a great deal of its desirable property as soon as it is mixed with either a grease or an oil. Of course, the difficulty of using dry powder such as molybdenum, every time you eject a blank, you break your bond and have to form a new one with the incoming blank.

Chairman Wood: I think we will have to call time on this discussion for the moment. I am sure Mr. Merriman will be very happy to discuss any of these problems with you immediately following the session.

Thank you, Mr. Merriman. (Applause)

Mr. Merriman: These display samples are here for anyone who happens to be interested in the various head styles that are made today.

Chairman Wood: Our next speaker for the morning will be Earle Lovering, Assistant Works Manager of the Seymour Manufacturing Company in Seymour, Connecticut. Mr. Lovering is also a graduate of M.I.T. This seems to be an M.I.T. morning. He worked, following his graduation in 1938, for a period, with Revere. That is another one of the brass companies, I understand. And since 1946, he has been with the Seymour Manufacturing Company, first as the Chief Metallurgist and now as the Assistant Works Manager.

Mr. Lovering will talk on the "Processing of Phosphor Bronze Wire". Mr. Lovering. (Applause)

(Mr. Earle W. Lovering read his prepared paper entitled, "Processing of Phosphor Bronze Wire", which was illustrated with slides.)

Chairman Wood: I have one question I would like to ask Mr. Lovering. At what gauge do you start annealing?

Mr. Lovering: We start that at approximately 11-32. The material is usually annealed in open fire furnaces. Below it, we start to anneal it to maintain the perfect condition we have to have on the finished wire.

A Member: Do you have to use any kind of coatings at all on your wire?

Mr. Lovering: You mean a coating like liming for steel and others? No, we haven't. To the best of my knowledge that hasn't been tried out by us or anybody else. Do you happen to know whether you think it would be effective?

A Member: I don't know.

What is it you are picking up? The precipitant, the oil you are recovering on that, where does it come from?

Mr. Lovering: That is the lubricant used in the rolling. Those are actually small rolling mills. If you have seen a flat wire mill, well, they are about the size of a flat wire mill, a little smaller. The lubricant just floods those rolls because that is a tremendous reduction and it gets so hot at the end that we would have fumes all over the place. In fact, they did, and everybody squawked about it.

A Member: What type of lubricant do you use? Is it the ordinary mineral oil type?

Mr. Lovering: On the multiple roll it is a mineral oil lubricant with some additives, I presume. I don't have the actual data with me on what we use.

A Member: Do you ever get any composition of that lubricant such as to cause any staining or shall we say, sludging effect on the wire itself?

Mr. Lovering: No, we don't get staining from the lubricant, but we get staining from the heat. The metal comes out and I don't know how hot it is, but it is so hot if you touched it you would

jump right up through the ceiling. I would say it is 500 or 600. It is so hot it forms brown oxide on the metal when it comes out.

A Member: But you don't get any lubrication decomposition?

Mr. Lovering: Well, I assume there is. Frankly, I don't know. I assume there must be at that temperature.

Chairman Wood: Does anyone else have a question?

A Member: Along the lines of lubrication, I have done quite a little research in the last six months there to get away from the vaporizing of the heat. That might be one of the problems. As I say, there are different kinds of lubricants still in the research stage.

A Member: That billet you start with, is that cast or extruded?

Mr. Lovering: That is cast. These alloys can only be cold worked, so it is actually cast. It is around two and one-thirty-second inches in diameter. It is around 100 inches long, pointed at one end. You see, if we could hot work it we would cast a great bit billet and extrude it, but you can't hot work it very readily.

A Member: I don't have a question, but I have a comment. In regard to this discussion of lubricants, that is, the lubricants that might be used for the drawing of this class of wire, I would say that with the bulk temperature involved, it is rather unlikely that any material decomposition of the mineral oil constituent would occur but since other types of oils in conjunction with the mineral oils are ordinarily used for this class of work, it is possible, due to high temperature, there might be come decomposition of the compound, particularly if it is an organic type.

However, I think it is the experience of a number of people who are working with these lubricants that with the average size of a system dealing with several thousands of gallons, and with bulk temperatures probably not exceeding 125 degrees, that the degree of sludging and decomposition is not serious, and certainly demonstrates no effect on the wire.

The type of oil lubricant the gentleman back here just mentioned represents recent research in the field. The advantage of that class of lubricant as against a water base fluid, particularly in the use of diamond dies, shows considerable improvement in die life.

The statistical experience of at least several people working in this field indicates you may normally anticipate at least 40 per cent fewer failures of dies with the oil fluid than with the water fluid.

Our next speaker for this morning will be W. Garwood Bacon, Jr. of the E. W. Twitchell Company. Mr. Bacon is the vice president and Sales Manager of industrial yarns at the Twitchell Company and has been with them since 1938. Mr. Bacon will discuss, "Twisted Paper's Role in the Wire Industry". Mr. Bacon. (Applause)

(Mr. Bacon read his prepared paper entitled, "Twisted Paper's Role in the Wire Industry", which was illustrated with slides.)

Mr. Bacon: I shall be glad to answer any questions here that I can.

A Member: I believe that pine tar was used previously. Would you say the two are of equal quality?

Mr. Bacon: Yes. We have spent two years—I won't mention the company's name, because they spent a lot of time on it—we spent two years with them developing a pine tar product because it is a known fact that with coal tar, there is the toxic content and we wanted to make the tests not only for the customers but for our workers' sakes.

We have streamlined our production technique so only in one or two places they come in contact with the impregnant and we have experimented with the pine tar and it is acceptable with an additive.

It did a good job with moisture resistance, but not fungus resistance, without something being added to it. It was tested by the same laboratory as tested the coal tar.

A Member: The final compound is satisfactory?

Mr. Bacon: The customer buying the material has not approved it as yet, but they are anxious to have it approved and are making a chemical analysis to see if any corrosive factors with regard to their aluminum or steel are present, but I don't think there will be.

A Member: I am interested in the samples that came out of the car. What was the impregnant? Was that silicon soda? I assume it was Romex.

Mr. Bacon: One was Romex and one was a circular sleeving made on a circular loom. Actually there was no treatment.

A Member: I worked on the original Romex work at the Romar Company and I was quite interested to see that the sample lasted that long.

Mr. Bacon: You are quite welcome to see the sample of the Romex type. The yarn used in the outer braid had no treatment. We probably used a little water when we spun the yarn to make it twist up, but I think in the wrap they may have used an impregnant.

A Member: We used silicon originally and then went on to the wax and so on. I will stop over and see you.

A Member: I am very much interested in Mr. Bacon's reference to their ability to make paper fungus-resistant. I would like to ask this question, what have the Underwriters in this country done about approving any non-metallic cabling of the fungus-resistant type paper or having it incorporated in it for barn installations?

Mr. Bacon: I want to talk about that, or rather around it. However, I will answer it as specifically as I can. I have no knowledge of an Underwriters' approval of any such construction. We are in the process now of making up samples. You might call it a reinforcing member consisting of paper and fiberglass, which would be fungus-resistant, for that purpose, but we have been so busy with other production items, that I have had a sample for a year and it hasn't been made yet. But, I know what you are getting at. Barn wire is expensive and, the way it is made now, it would stand up better if the paper were fungus-resistant. There hasn't been any made to my knowledge. Other competitors may have done it, but if they have, I doubt if it has gone to the point where they have actually submitted it and had it approved by Underwriters. That would be the procedure. It would be our intention to have it approved for that purpose before putting it on the market.

Chairman Wood: Are there any other questions? Thank you very much, Mr. Bacon.

I believe we will adjourn the meeting then if there is no further business.

(The meeting recessed at eleven- thirty o'clock.)

FERROUS DIVISION

TUESDAY AFTERNOON SESSION

NOVEMBER 10, 1953

This session convened at two o'clock. Ray S. Worth presiding.

Mr. Worth: Ladies and gentlemen, this program this afternoon is going to differ slightly from the program of this morning, when we had a single topic.

Our first speaker this afternoon will be Vito J. Vitelli, Process Engineer, Steel Wire Mill Division, John A. Roebling's Sons Corporation.

Mr. Vitelli was graduated from Lehigh University in 1947 with the degree of Bachelor of Science in Metallurgical Engineering. He was employed by the American Steel and Wire Corporation, Trenton Works, in 1947. In 1948 he joined the Roebling Corporation as a Process Engineer in the Metallurgical Engineering Department, Steel Wire Mill Division.

Mr. Vitelli then presented his prepared paper entitled: "The Drawing of Shaped Steel Wire."

Chairman Worth: Now, are there any questions from the floor that you would like to ask Mr. Vitelli?

A Member: I would like to know the largest squares you can get from certain sized rounds? Do you attempt to make some with less reduction?

Mr. Vitelli: We have some practices where we make some wire where we draw two holes. This particular product comes from a .281 diameter rod. Now on this product the diagonal would be in the neighborhood of .225".

A Member: On the first breakdown pass from round wire, do you make dies

with shaped angles or conical angles?

Mr. Vitelli: We used a conical approach rather than a shaped approach.

A Member: Is the rod for your "S" shape rolled in a conventional rod mill? Is the section more or less of the same shape as in the wire?

Mr. Vitelli: Without elaborating on the first part of your question, I would merely answer that by saying "yes."

On the second part, the section that we originally rolled was the same shape except larger, but now that we have revamped the practice and it is now a compromise shape between all of the four shapes that we do draw.

A Member: I would like to know about straightening and cutting—how do you straighten and cut your triangles?

Mr. Vitelli: That is something that we have never done in our plant.

Chairman Worth: Are there any further questions?

If not, I want to thank Mr. Vitelli for a very fine presentation of his topic. (Applause)

Our second paper will be presented by J. D. Armour of the Republic Steel Corporation.

Mr. Armour received his technical training at Carnegie Institute of Technology, Pittsburgh, Pennsylvania.

He is a member of the American Society for Metals, American Society for Testing Materials and Society of Automotive Engineers.

His early practical experience in the steel business was with the American Steel and Wire Company and Jones & Laughlin Steel Corporation. In 1919 he joined the metallurgical department of Union Drawn Steel Company and became chief metallurgist in 1922. He has continued to function in that capacity since the absorption of Union Drawn Steel Company by Republic Steel Corporation in 1930.

He has published several papers over the past years on machining of steels and on annealing under prepared atmospheres and carbon restoration in annealing.

(Mr. Armour presented his prepared paper entitled: "Continuous Annealing with Carbon Restoration of Coils and Bars".) (Applause)

Chairman Worth: Thank you, Mr. Armour.

Now, are there any questions from the floor?

A Member: Do you pickle off your hot rolled steel before treating it for restoration?

Mr. Armour: Yes, that is quite necessary.

A Member: Do you coat your coils?

Mr. Armour: That is just normal practice. We do that so that they do not start to rust.

A Member: You mentioned that you intentionally add carbon to the surfaces.

Mr. Armour: Not where it has been properly annealed along with it. If you have an annealed structure of the right hardness, you could create some trouble if you added carbon. If you did not have the proper annealing condition you would put it into a soft condition.

A Member: Is carbon restoration efficient at an annealing temperature of 1320 or 1330 or do you have to go up to 1500 to make a good job?

Mr. Armour: There will not be much action at 1300 but you can get some action at temperatures from 1400 to 1425.

A Member: Can you control the amount of carbon—the per cent of carbon on the surface by your process?

Mr. Armour: Within certain limits. We don't like to be held down too closely on that.

A Member: Do you make a carbon test on the surface to determine the annealing practice?

Mr. Armour: We cut samples representing the entire circumference of sample bars from each individual life of bars. We take a sample from the back end of the first lift, which also represents the front end of the second lift and so on. By taking a sample from the back end of every lift we have a check on both the front and back of every lift of bars on the continuous furnace.

A Member: Do you do that before or after?

Mr. Armour: We are not particularly interested in that. We work to what the maximum will be. We carry out our carbon correction on the basis of sufficient time to get carbon correction for 25 or 30 thousand penetrations.

A Member: And you say you do that on the basis of microstructure or carbon analysis?

Mr. Armour: Both, but normalling on the basis of microstructure. We look at it under the microscope and see if it looks good.

A Member: If you had a fifty carbon steel and twenty-five thousand decarb, wouldn't the carbon build up on the surface pretty high? You don't get a uniform grade in there, do you?

Mr. Armour: You do if the carbon content of your gas and temperature and those things are all right. You can put fifty carbon into a fifty carbon steel and it will be fifty carbon. As far as the laboratory is concerned, you might be able to do that minus or plus a point or two. In production you might be able to do it within plus or minus five points or even ten points. What you don't have to do is put in something that is one hundred carbon on the outside and grade it down to fifty carbon.

A Member: Do you purge your loading chamber before you open up your inner door?

Mr. Armour: Yes, both vestibules have to be purged immediately after they have been opened for either charge or discharge and the cars put back in.

A Member: How about steels in the neighborhood of seventy carbon or higher?

Mr. Armour: Yes, we have had quite a variety. The reason we showed these is because that is where most of our applications have been.

Chairman Worth: I want to thank Mr. Armour very kindly for his presentation. (Applause)

The third paper on our program will be given to us by W. E. Hill, Jr., Plant Superintendent of the Russell, Burdsall & Ward Bolt and Nut Company.

Mr. Hill graduated from the Missouri School of Mines with a Bachelor of Science in Metallurgy. He was employed by the Columbia Steel Company until 1944.

He joined his present organization in 1946 and is now Superintendent of the Plant at Rock Falls, Illinois.

(Mr. Hill then presented his prepared paper entitled: "Rod and Wire Quality versus Cold Heading Quality".)

Chairman Worth: Thank you, Bill. Now, are there any questions from the floor on Bill's presentation?

A Member: Do you make a practice of roll threading steel?

Mr. Hill: Yes.

A Member: How about the manufacture of the part where the thread runs down to a point?

Mr. Hill: Yes, we do, sir. I presume that you are speaking of the gimlet point or the one similar to that lag screw. We use ribbed steel on that too.

A Member: Do you get a good clean thread?

Mr. Hill: Yes.

Chairman Worth: If there are no further questions I want to thank Bill for a fine presentation. (Applause)

Chairman Worth: We are winding up our session here on the early side. However, before we leave I do want to thank those of you here for coming in this afternoon and I hope that you enjoyed the session.

(The meeting recessed at 3:30 o'clock, p.m.)

NON-FERROUS DIVISION

TUESDAY AFTERNOON SESSION

NOVEMBER 10, 1953

The meeting reconvened at two-ten o'clock, with James E. Flood, Chief Chemist, Plastic Wire and Cable Corporation, Jewett City, Connecticut, presiding as the chairman.

Chairman Flood: Our first paper this afternoon is by C. C. Lawson, Wire Development Engineer for the Bell Telephone Laboratories. We are very fortunate in having Mr. Lawson talk on, "Rural Distribution Wire", which is a very vital subject in the insulated wire field. Mr. Lawson.

(Mr. C. C. Lawson read his prepared paper entitled, "Rural Distribution Wire", which was illustrated with slides.) (Applause)

Chairman Flood: Do we have some questions for Mr. Lawson?

A Member: Mr. Lawson, would you care to comment on the feasibility of all EBC construction on this type of wire?

Mr. Lawson: I can tell you that we didn't get the electricals that we would out of PVC. We started off with an all polyethylene structure, but put the PVC jackets on the outside to get added toughness.

A Member: The significance of the semirigid plastic on the outside is for what purpose? Is it for added protection?

Mr. Lawson: Yes, we added the semirigid because it would be tougher we thought than the more highly plasticized compound or jacket compound.

A Member: There was no questions of migration of plasticizers from the other types, from the polyethylene stronger properties?

Mr. Lawson: I slipped over that without mentioning it. I do mention it in the paper. This is a non-migratory plasticizer in the PVC jacket.

A Member: You mentioned both semirigid and rigid. What are the differences in the specifications between the two compounds and how do they perform relatively as the secondary installation?

Mr. Lawson: Our experience to date on this particular wire is with semirigid compounds, so-called. We have been looking at some of the rigids that seem to have an application here. So far there have been none of the wire made for us with the rigid compound. We think it offers promise but we haven't actually put it on the wire yet.

A Member: How do you establish any specifications on the rigid such as cold bend or Brinnell hardness or something of that order?

Mr. Lawson: We have not done that. We have looked at several compounds available and we think they may be good enough, but until we have a little more experience, I don't think we will set the specification requirements for them.

A Member: On your steel core there, I notice it is insulated, but is that used at all as a return circuit? There are six pairs there. Is the steel core used at all for the return?

Mr. Lawson: The steel core on this wire is used entirely for mechanical strength for supporting the structure. If it were non-metallic, I think it would probably be a little better. But, we don't know of anything strong enough or cheap enough to use for the purpose. It offers some problems, we have to insulate it when it is in the center of this configuration.

A Member: It is just used then for the mechanical strength.

Mr. Lawson: Yes.

A Member: On the steel supporting member, have you done any further work on aluminum wire in place of galvanized wire?

Mr. Lawson: Not particularly for this purpose. We are always interested in a good aluminum-coated steel wire.

A Member: That specification you quoted, I am not familiar with. Does it have any electrical specifications?

Mr. Lawson: The ASTM specification for the ACSR core does not, as I recall.

A Member: It is not similar to the one for the ACSR core?

Mr. Lawson: It is about similar in strength, but this has better conductivity.

A Member: And is there elongation?

Mr. Lawson: Yes. Actually, this wire is a telephone wire for which we do have a specification. It is called 019-E steel line wire.

A Member: That pair of conductor wires, are they solid copper?

Mr. Lawson: Solid copper.

A Member: Can't you use heavily-coated steel to do away with the heavy stretch?

Mr. Lawson: We are looking for as much conductivity as we can get in as small a size.

A Member: In other words, you want 100 per cent conductivity in the copper, and the idea of using the steel wire does away with your center member support. The support itself wouldn't be feasible?

Mr. Lawson: Well, I don't want to go so far as to say that. It may be entirely feasible.

A Member: It is something to work on.

A Member: I was thinking of these cores where you ask for a higher conductivity than core wire which is 8 per cent; why the additional conductivity?

Mr. Lawson: Well, I think maybe it is because we get it in this wire. It is a wire we are familiar with and we have had quite a bit of experience with it as a telephone wire and I don't think that the conductivity business bothers us very much.

A Member: That is sort of secondary requirement?

Mr. Lawson: Yes.

A Member: On the secondary installation, the semi-rigid as against the rigid, have you found any improvement in the electrical qualities in the unplasticized or rigid shielding over the plasticized?

Mr. Lawson: There we do, yes. We can get some better electricals out of the rigid compound and we like to use it when we get one we feel is good enough mechanically.

A Member: In using that central member in connection with central wire in connecting with your holding member, do you not find the unbreakable flow or breaking away of the polyethylene?

Mr. Lawson: You mean at the supports?

A Member: Yes.

Mr. Lawson: These supports clamp down with a bolt and you get enough pressure exerted by turning down that nut to crush the polyethylene and hold firmly on the steel.

At terminations we do remove the polyethylene if we are going to use a deadened sleeve.

A Member: What mileage span do you operate that on?

Mr. Lawson: You mean the supported span?

A Member: How far do you use it, ten miles or fifty miles or how far do you use it?

Mr. Lawson: Well, the span length is usually about 250. We load this wire up to about 60 per cent of its ultimate breaking strength of the steel support. That means that under heavy loading of wind and ice we will not exceed that value. It is about 1060 pounds and it means there will be no permanent set in the wire so you don't have to go back and resag the line after a heavy storm. Two hundred and fifty feet is the usual span we expect from this wire. In heavy loading areas it can be used in longer spans, in the Southern states where the loading is not so heavy.

As far as the length of run, it has been used in runs up to 15 miles at the present time. I don't know what the limit will be when it is loaded.

A Member: On that cable, there is a six pair twisted, each pair is twisted and of course, they are twisted on the steel core. Do you find the permeability of the steel wire has any effect on the attenuation loss in comparison with a non-magnetic steel wire core?

Mr. Lawson: I don't know as I can give you a good straight answer to that one. It does not bother us. Let's put it that way.

A Member: In other words, the attenuation over a certain distance is sufficient without loaders?

Mr. Lawson: That is right.

A Member: How many subscribers is it possible to service with one single length of cable to six pairs.

Mr. Lawson: Each pair, unless you have carriers on it, is good for one subscriber or a group of subscribers on a party line. With this construction, several subscribers can be taken off the same pair on a party line.

A Member: It is possible then to get 24, is that right?

Mr. Lawson: If they have semi-private lines, yes. With private lines you have six. If you have got 12 party lines, you have got 72.

A Member: Would you say that the polyethylene is used to give you better electricals and the rigid gives you much better electricals? If you got a satisfactory unplasticized rigid, do you think it would dispense with the necessity of the primary installation of polyethylene?

Mr. Lawson: I think it would. We haven't achieved quite that end point. I think probably it could be worked, yes. There is no high frequency anticipated on this circuit. It is just voice frequency and there the power factor of the installation is not important.

Chairman Flood: If there are no further questions, thank you very much, Mr. Lawson. (Applause)

Our next paper is, "A Review of Fluorothene in the Wire and Cable Industry", written by F. W. Wurtzell and W. J. Canavan, and B. H. Maddock, Development Engineers of the Bakelite Company, New York City.

The paper will be presented by Mr. Wurtzell.

(Mr. Wurtzell presented the paper entitled, "A Review of Fluorothene in the Wire and Cable Industry", which was illustrated with slides.) (Applause)

Chairman Flood: Do we have some questions on Mr. Wurtzell's paper?

A Member: I understand your work on extruding fluorothene has been restricted to thin walls. What is the possibility of use for heavier wall installations?

Mr. Wurtzell: Fluorothene is a very rigid material. It is classified as such, and while it is possible to extrude heavy cross sections, their adaption to the wire industry would be limited by the flexibility of the wire produced with the heavy wall on it. Then, there is also the consideration at present of the high cost. However, I don't think it would be an

extremely easy job to sell heavy wall wire when you were using an expensive material.

A Member: You just mentioned a new pertinent word, high cost. Can you give us an idea of the economies of fluorothene and what you might expect as the use of this material grows in the wire and cable industry?

Mr. Wurtzell: About the only way I can answer that is to say the mystery of every resin that has been developed for the wire and cable industry has shown a remarkable drop in price as the usage and production of material increased, and I see no reason to anticipate any other curve for fluorothene than we have experienced with polyethylene and the others.

A Member: As I recall in your description of the polymer you have one chlorine in there. Does that give you sufficient clarity in your compound to warrant the possibility of using a plasticizer to change the characteristics of the finished resin?

Mr. Wurtzell: There has been a considerable amount of work done on the effect of plasticizers in the fluorothene type of materials, but actually, it is the same as plasticizing any other material. Your plasticizer is always the most volatile constituent and in the case of fluorothene where you are operating from temperatures of 300 degrees up, the plasticizer will leave in a very short time or become ineffective, so in a sense you end up with the unplasticized resin you started with. I don't think you help yourself too much by using a plasticizer as far as finished properties of a wire insulation go.

A Member: In the curves on stabilities, the increasing concentration followed a definite pattern except for the curve of 1.5 per cent. That seemed a different pattern.

Mr. Wurtzell: I am not sure I can answer that question. It may indicate a trend toward using .5 per cent of a color as a stabilizer as we do in the others, and it may be one of those quirks you get in experimental data. I think we have to do a lot more work on the effect of additives all along the line, until we establish .5 per cent has a more stabilizing effect than .1.

A Member: What harmful effects have you noticed or come across as far as corrosion is concerned on the external parts of extruding machines from any gas from fluorothene?

Mr. Wurtzell: The effects of external corrosion would be rusting of the castings, the parts themselves. Actually, it hasn't been of a sufficient problem to warrant making the whole part out of a more expensive alloy. You have to choose your alloys so they will retain their strength indefinitely or for a practical machine life that operates at temperatures of 600 to 650, and that is probably of more important consideration than the external corrosion you might get.

A Member: You suggested the use of nickel screws and the same material for the die. I wonder how long you could run with a conventional extruder with the steel screws and dies before you ran into decomposition?

Mr. Wurtzell: It depends on how you run the machine. A couple of unfortunate abuses of the material could put you out of business in an unseasonably short length of time. Most of the screws today are built with the high alloy type hard materials and they in themselves are pretty resistant, but you would suffer by pitting, and then the material would collect in the pits and you would get subsequent molecular breakdown and decomposition from the material lying in the pits and that would carry on through to your insulation and give you spark failures.

Actually, it doesn't disintegrate the screw. You don't all of a sudden one day find you are running your machine without a screw.

A Member: Does iron and steel affect the compound?

Mr. Wurtzell: Iron does. The effect of the iron oxide showed that.

Chairman Flood: Are there any further questions? If not, we are very much indebted to you and the rest of your office. (Applause)

Our final paper for this afternoon is by C. E. McCormack and Mr. R. H. Baker of the Rubber Chemicals Division of E. I. duPont de Nemours and Company of Wilmington, Delaware. It is a paper on, "Neoprene Coverings for Weatherproof Wire." I am sure it will be interesting as many of us have seen the damage that can be done by our old type of braided and saturated protections. Mr. McCormack, I believe, will read the paper.

(Mr. C. E. McCormack presented the prepared paper entitled, "Neoprene Coverings for Weatherproof Wire," which was illustrated with slides.) (Applause)

Chairman Flood: Do we have some questions for Mr. McCormack?

A Member: You speak of properly compounded material. Could you clarify that a little bit?

Mr. McCormack: I might say any neoprene compound wouldn't necessarily make a good weatherproofing covering and the wire and cable manufacturers take neoprene as we sell it here and add a lot of things to it to insure the finished compound giving good service in the field.

For example, if you could make color, if you would leave the black out, it wouldn't weather as well as it would in this case here.

A Member: How much neoprene percentage-wise would you normally have in a commercial covering?

Mr. McCormack: That would vary somewhat, depending on the manufacturer, but I would say it would run between 40 and 50 per cent by weight. The percentage by volume is somewhat larger, though, because the neoprene constituents have a higher status of gravity and I would say it would be between 50 and 60 per cent of volume.

A Member: Besides the carbon black, how does the jacket composition differ from a weatherproof cover?

Mr. McCormack: I would say the main difference between a weatherproof stock and a jacket stock is that most manufacturers who made their weatherproof stock with high measurable weatherproofing properties in the jacket—this is usually measured by using a lower carbon black than in the jacket. You can use, however, quite a bit of black in the weatherproofing coverings. I think a lot of people do. You can use it without making the electrical properties too bad and the amount which you can use is sufficient to provide a good weathering which is usually associated with the black compound.

A Member: You mentioned the brittle point, -40°C. Does that represent the minimum temperature at which it can be flexed and bent?

Mr. McCormack: That is right. That figure of -40 is obtained in the laboratory by striking the specimen of the covering a sharp blow. I think it is ASTM 46. If you take a piece of wire and wrap it around a mandrill you get a 10 degree lower test usually. From -40, you might go to -50 in a wrap test.

A Member: What is the largest size of weatherproof neoprene produced?

Mr. McCormack: It was partly regulated in the early days by the fact copper could be quite heavy and it would drag down and injure it. As far as I can establish, just from looking around —well perhaps the extruded people can tell us what the limits would be.

A Member: Could I ask one loaded question? We listened to the Bakelite representative here this afternoon tell us about a new insulating material, and I guess everybody in the room has heard about polyethylene and polyvinylchloride. Sitting back here and not knowing too much about these various material, what have you got to recommend on your neoprene that is so much better for the weatherproof wire than the products we have heard so much about?

Mr. McCormack: The subject of my paper was, "Neoprene Coverings for Weatherproof Wire," and I think that question is beyond the scope of my paper.

Chairman Flood: Any further questions within the scope? If not, we are grateful to Mr. McCormack and Mr. Baker for their fine paper.

If there are no further questions, we will stand adjourned.

FERROUS DIVISION

WEDNESDAY MORNING SESSION

NOVEMBER 11, 1953

The Ferrous Division meeting was reconvened at nine-thirty o'clock, C. H. Williams of the Pittsburgh Steel Company presiding.

Chairman Williams: The meeting will be in order.

Gentlemen, it is indeed a pleasure for me to conduct this meeting and I am sure that you will enjoy the papers which are to be given this morning. I am sure that they will be very interesting and they should arouse a lot of

interest and make for some questions.

This meeting will be conducted in the same manner as those of yesterday.

Our first paper this morning will be on the "Handling and Storing of Wire and Wire Products." It will be given by C. C. Tappero, Superintendent, Wire Mills, Colorado Fuel & Iron Corporation of Pueblo, Colorado. Mr. Tappero has been Superintendent of the Wire Mills there since 1950.

I present to you Mr. Tappero.

(Mr. Tappero then read his prepared paper entitled: "Handling and Storing of Wire and Wire Products".) (Applause)

Chairman Williams: We will now entertain questions from the floor. I am sure that there must be some. No doubt some of you have gone through what Charley is just finishing and possibly others are planning a transition period now.

A Member: I noticed that in one of your first pictures you showed large stacks of rod. Was that at the rod mill or the wire mill?

Mr. Tappero: That was at the wire mill. We do not stock at the rod mill. We load from our conveyor on to these shuttle cars that go back and forth between the rod and wire mill.

A Member: Then those stacks of rods you have are waiting for the wire mill itself?

Mr. Tappero: Yes.

A Member: How are they stacked—by fork trucks?

Mr. Tappero: Yes. We can do it three high with the standard 6000 pound fork truck.

A Member: You mentioned at the start that you went from 165 pounds to as much as 700 pounds. Did you make any material changes in your finishing blocks?

Mr. Tappero: Yes, we did have to change the setting on our pins. Naturally we put in a stronger pin than we normally used.

A Member: But you used the standard blocks?

Mr. Tappero: Yes, and other than changing the taper or the offset of the pin we have not changed the blocks. In some cases we did have to work with a taper in order to get that pushed up, but other than that we did not change the blocks.

A Member: What size bundles did you use?

Mr. Tappero: Generally on the finer wires at least four hundred pounds and on the coarser wires up to seven hundred pounds.

A Member: Did you have any difficulty on the larger bundles of machine pulling?

Mr. Tappero: Yes, we had to put more ribs in the reel in order to keep that bundle from sucking up on the reel and particularly on the finer wires, on those wires it would put a crimp in your wire.

A Member: Many years ago you put in a very substantial installation for the handling and storing of rods. Have you abandoned that in preference to your trucks?

Mr. Tappero: We have abandoned that entirely.

A Member: In other words, handling it with your trucks is much cheaper than the other system?

Mr. Tappero: In fact, we changed that just before we started in with the new rod mill. In fact we use that building now for the storage of in-process wire rather than for rods. We keep all of our rods out on the dock.

A Member: Have you ever studied the use of overhead cranes in your warehouse just to reduce the room of labor for trucks?

Mr. Tappero: I presume that you mean in order to eliminate aisle and other space. I have given that some thought but I don't think that you would gain anything.

An overhead crane system is definitely limited to what it can do. If you would use them in order to stack things then it would result in the fact that you would then have to take them down with the crane and then have another means of transporting them. That would mean double loading. In our system that material can remain on the pallet until such time as you take it to the railroad car for final unloading. I believe that this gives you a more flexible operation.

I might also say that our material is contained in four different warehouses and a loading crew with a fork truck can go into any warehouse and pick up a load. They are not dependent upon somebody else to be setting that load up for them.

A Member: In that handling of rod, are you concerned particularly with the first and last output ramification there—and what is the effect of your later output?

Mr. Tappero: Essentially that does do that within any one pile. Say that one pile of rods there would all be a heat that came down at the same time. Now, to preclude allowing rods to remain in stock too long we will set up two piles and work one completely out before we go back to the other one that is being put into stock. That will preclude keeping them on hand too long.

A Member: What is "too long?"

Mr. Tappero: In our part of the country we can keep them there practically indefinitely. We are very fortunate in that it is quite arid there and the rods, during the summer, can sit out there without showing any evidence of rusting. We seldom have to worry about pitting. We are fortunate in that respect. We do leave rods sit around much longer than anyone else.

I didn't really answer your question. "Too long" would be to get it in before we get any rusting. However due to the time element, it is not a problem.

Chairman Williams: With no more questions, Charley, I want to thank you for a very fine paper and we certainly appreciate your efforts. It was very good. (Applause)

Our next paper will be given by Maurice G. Boyd, Assistant West Mill Superintendent, Steel Company of Canada, Hamilton, Ontario, Canada. He will talk to us with regard to methods of controlling quality. This is a subject that I am very sure is important to all of us and it should arouse some interest.

I now present to you Mr. Boyd.

(Mr. Boyd then read his prepared paper entitled: "The Foreman's Function with Regard to Methods of Controlling Quality".) (Applause)

Chairman Williams: I think that all of us perhaps do a certain amount of this work which Maurice has done, but I doubt whether many have gone into the detail that Maurice has. You can see that this has paid results for their company.

I think there should be some questions and we will entertain them now.

A Member: I believe that I recall a statement that Maurice made that in the presentation of the rate sheets that they should carry the notation that rejects will not be paid for.

I would like to ask whether that has always been the situation there or whether that is something which has been newly instituted since their program has gone into effect?

Mr. Boyd: We have always had it there and it is a big help.

A Member: I was going to ask about the same thing. We have the problem of where we do not pay for rejections but at times you have got to slow down the machine and run a job away from the standard set.

What do you do in cases where you cannot run the job the way it is set up and have to slow down in order to produce a good product.

Mr. Boyd: Who slows the machine down, the man or the foreman?

A Member: The man.

Mr. Boyd: Does the foreman know that he is doing that?

A Member: At times but he does not always know.

Mr. Boyd: What I would do would be to put a notice on the board that should the man run into any difficulty like that, that he report it to the shift foreman and have him give the man instructions and at the same time initial that slowdown on the test sheet. That is one of the procedures which we have for the foreman must sign all of the sheets. In that one section, where I outlined the list of causes, that could happen. The furnace may not be heating correctly and so on. The foreman, if he gets any unsuitable variations, he has to determine the signable cause and note it on the bottom of the test sheet.

I think that if you were to do that it would surely help the man out.

A Member: What I am thinking of is where you produce something on a standard does the operator take the licking or is the company bearing that?

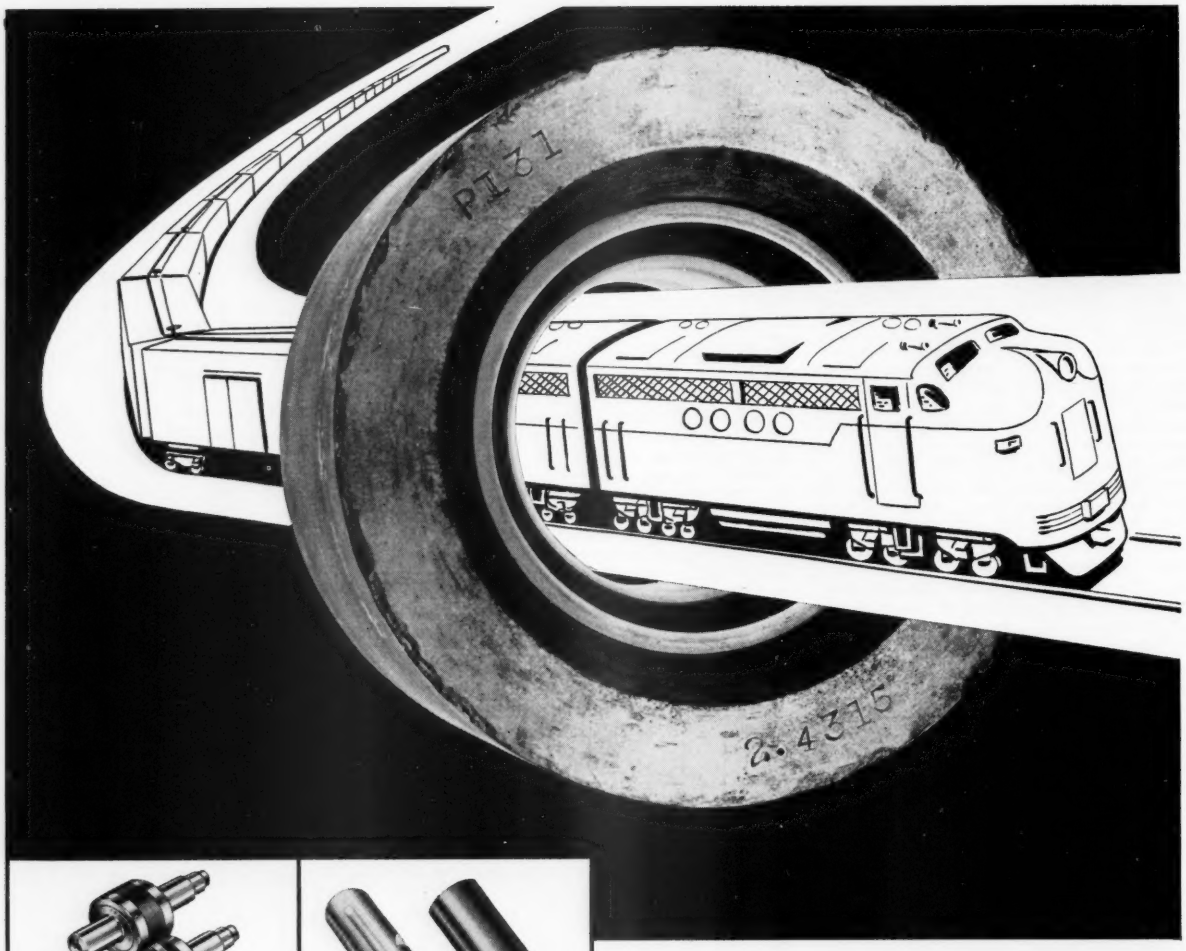
Mr. Boyd: The company would if the material were off color or didn't meet the proper requirements and you could therefore not get the proper results. I think that the company would have to take the licking on that.

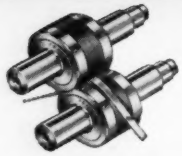
A Member: How would you compensate the man for that, would you pay a special rate?

Mr. Boyd: We would get the industrial engineering department to work out a rate at the speed which would be found suitable. We would put through a special slip signed by the Superintendent.

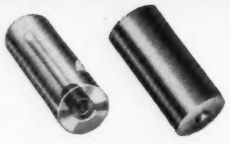
A Member: I would like to know how you control the patented strength. I realize that this depends on the material and the processing but I am curious to know what sort of standards you have for controlling the patented strength.

Mr. Boyd: You are thinking there of a tensile strength. Well, over a period of time we have established statistically what we could run that furnace at. We





Wire-flattening rolls



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have a rate of speed for each size and for each carbon range and we find that we are pretty well within the limit.

On the oil tempering unit, we are doing a finished material there.

A Member: Do you adjust the temperatures to get what you want or do you just choose an analysis to give you what you want?

Mr. Boyd: We try to adjust the speed first and then the temperature.

A Member: You mentioned that you did not pay the operator for faulty material. How about the cost of sorting? It is sometimes necessary to sort out the faulty material. I don't think that you can penalize the operator for that.

Mr. Boyd: That depends on whether or not it is his fault in the first place. If it is his fault then he runs it at his expense.

A Member: But he still gets paid for the time that he is doing that sorting?

Mr. Boyd: Only on day work.

A Member: Getting back to the same thing that was asked previously—if you were faced with a situation that you didn't inherit, where you had been paying for rejects and you had realized it wasn't right and you had determined and made up your mind you were not going to do it—what would be your attack on that?

Mr. Boyd: That is a curve ball, slow and outside. (Laughter) Well, I think that basically people do not expect to be paid for faulty work and I think that you have to take a stand on that.

We have a lot of rudiments here and we did not get them the easy way. Sometimes it takes a year and a half to get a department straightened out and once in a while you cannot move any faster than you solve grievances. You have got to go ahead on the basis that people do not expect to be paid for faulty work.

A Member: What problems did you encounter when you instituted the program outlined in your paper?

Mr. Boyd: Well, it gets around to the point that you cannot go any faster than you can solve grievances. That was one of the human elements that we did not discuss this morning. It is a failing that we all have, in that we resent change and it comes from being familiar with things. It is just like an old pair of shoes for you are more comfortable and more at home when you are wearing them. The same thing is true when you are doing a job that you have been doing for years. You feel much more comfortable with it and you develop more efficiency as you do it. Well, somebody comes along and puts in a new system and you immediately find yourself with some decisions to make. You find that you are not sure of yourself and that you are prone to error. I don't think that there are any of us who like to be the focal point of error. Therefore, rather than find yourself in that position you immediately resist that change.

There are a few things that you can do when instituting changes in the mill. One of them is not to do ahead any faster than you can sell those ideas. You have to go up and talk them over with the fellow on the job—get his idea.

Another thing, keep everyone above and below you well informed about what you are trying to do. Always talk to the shift foreman if you have a problem for if there is something wrong he will generally spot it.

The third thing that I would like to say is to be as generous with the men as you can in the way of monetary return. If your procedure calls for something that is more work on his part, get the industrial engineering department out there and re-evaluate that job. Give him what is coming to him.

A Member: Would you enlarge further on the benefits referred to in your paper on increased output, lower scrap and lower rejections and so forth?

Mr. Boyd: When quality is there and the output is high and the yield is good, then there have been a good many things done out there on the floor that have been the right step. The foreman has looked at the men that are on the job and he has made sure that they are well trained and that they understand what they should be doing. He has checked his materials on the floor and he has made sure they are the right type that the order calls for. He has checked his charts and is sure that the men are doing what they are supposed to be doing. He has looked the equipment over every week to see that it is in operating condition.

I think that sums it all up.

Chairman Williams: If there are no other questions from the floor, I want to thank you for a very fine paper and I think that those nine months that you had to think about it were well spent. All of the people here appreciate it.

Our next paper is to be given by a man who is in the sales division of a steel company. It is a little unusual for this group to have someone like that give a paper. This gentleman has been in sales a good long while and he wants to give us some of his experiences in relation to the production and sales problems that come up concerning the customer.

I would like to introduce Eugene K. Wright, Sales Manager, Manufacturers' Division, Continental Steel Corporation. (Applause)

(Mr. Wright then presented his paper entitled: "Production and Quality Control, Plus Mill Information—Sales Departments Musts.")

Chairman Williams: Before we go into this I would like to remind you that this is not a sales meeting. This gentleman is here and he has spent a good portion of his life in sales and is here to give us the benefit of his experience of the time between production and customer relationships. Needless to say, we cannot entertain any questions regarding pricing and similar information. I am going to ask that you confine your questions to production problems.

A Member: When we talked about having a paper like this we were told that the wire mill production men would run the salesmen out of the meeting. I am happy to see that this hasn't happened.

I would just like to know from you fellows whether you enjoy papers of this type. I personally think that they are fine. We people who produce these products are always cussing the sales department out for not doing the right things. We are always griping with the sales department about trying to sell what is in the book and cutting out all of the fancy stuff.

I am glad to hear the other side of the question and I would like some comments on that if there are any.

Chairman Williams: I personally think that this is the place for them. I have enjoyed this and I think that we should invite them back.

(Cries of "Yes we should".)

A Member: I have met a lot of peddlers but this is the first time that I have heard a steel salesman tell us what it is all about.

A Member: I would further like to indicate that I think that it would be fine if we could have papers such as this at future meetings, and, further, possibly somebody from the production department could prepare a paper that might counteract some of these things. Maybe the two could get together before the meeting and decide on a rebuttal type of presentation.

A Member: This paper was well-timed and presented excellently and I would like to ask one question. If you were in the production department, how would you combat a schedule made by the sales department, which is just impossible to produce in the mill? I am quite sure that some of these men have run up against problems where the sales department made promises that were just impossible to meet.

Mr. Wright: We have a scheduling department as part of our own main office and any production or shipping promises made to customers, in order to be valid, must be obtained from this department.

After getting the production and shipping promise I do try to inform the scheduling department in our own main office of the promise that I got from our mill.

In our own organization we do insist that all shipping promises be obtained from the site of production. That is the only way that it will work.

A Member: Are there any new procedures that the sales folk are thinking about to more accurately predict the advance demand, demand in advance of specific orders?

Mr. Wright: Sales departments, generally speaking, follow the published reports of anticipated automobile production, and also home appliance production.

Chairman Miller: Are there any other questions?

Gentlemen, I want to thank you again. I also want to thank these three men up here for their presentations for they were excellently done.

Before we leave I should like to introduce to you John Sanderson, Chairman of the Ferrous Division.

Mr. Sanderson: I was very happy to hear that you would like to have more papers like this last one. This is our final session and we have done a great deal of experimenting.

I would like to say that these meetings are your meetings. In fact, we have asked each one of the program chairmen and the participants to make an evaluation, good or bad. I have been told that this is the very first time that anything like this has been tried. However, in other associations they do evaluate these things and pass them on to the next chairman.

I would also like to say, from what I have heard, that some fellows are very reluctant to give the guts of what they are talking about. They will hit the borders but not the middle. However, I don't believe that we have found that to be the case here.

Chairman Williams: We are now adjourned.

The meeting convened at nine-twenty-five o'clock, with Leslie C. Whitney, Chief Metallurgist, Copperweld Steel Company, Glassport, Pennsylvania, presiding as the Chairman.

Chairman Whitney: This morning, we have three very interesting papers to be presented on three quite widely different subjects. Each paper deserves full consideration and consequently we will have to stick pretty close to a time schedule. We will hope that each and every one of you will feel free to enter into the discussions, as very often you get more out of the discussion than you do out of a paper.

We are very much honored this morning in having one of the outstanding men in the rubber industry to speak to us, Dr. John T. Blake, Director of Research for the Simplex Insulated Wire and Cable Company of Cambridge, Massachusetts. To say that Dr. Blake is one of the outstanding men in the profession is substantiated by the fact that the American Chemical Society saw fit to award him the Goodyear Medal for excellency in rubber research.

Dr. Blake, this morning will speak to us on, "Results of Research on Insulated Wire." Dr. Blake.

Dr. Blake: Gentlemen, I would like to change that title a little bit to, "Results of Research on Rubber Insulated Wire," because I would like to disregard the other insulations in general in order to be able to get through somewhere near on time.

(Dr. Blake read his prepared paper entitled, "Results of Research on Rubber Insulated Wire.") (Applause)

Chairman Whitney: I think we will all agree that Dr. Blake has presented a very, very interesting paper and the completeness and thoroughness with which he has carried out his experiments—it is amazing what results are shown here.

A Member: Could you comment on the results of any of your tests on the microbe attack on the vinyls and polyethylene?

Dr. Blake: As near as we can make out, polyethylene is completely resistant to microbial attack. In one respect, that is interesting, because paraffin is very susceptible and apparently as the chain length of it increases, it loses the ability to be attacked by soil microbisms.

The vinyl compounds vary in the same way that rubber compounds vary. There is no such thing as a rubber compound since rubber compounds are not all rubber. The rubber compounding is a mixture of an art and a science and it all depends on what the compounder adds to the rubber as to what he gets.

In the same way, vinyl compounds can be varied tremendously, depending on what is used in the composition. In many cases, the plasticizers can be attacked by soil micro-organisms and can result in a loss of plasticizer, leaving the pure polyvinyl chloride. What apparently happens is that the plasticizer in the surface of the insulation is consumed by the micro-organisms and more plasticizer diffuses from the interior of the surface and is again consumed.

On the other hand, some of the plasticizers which aren't consumed in this manner apparently resist this sort of an influence. Some PVC compounds containing paraffins, where the paraffin blooms to the surface, can get completely covered with fungi attacking the parrafin.

A Member: I heard a fourth-hand report that the British have found trouble in vinyl insulations on fungus in the tropics and that they were accordingly going to do some research on rigid insulations for wire. Have you heard anything about that?

Dr. Blake: There has been a lot of trouble in this country, too, and I think there should be some distinction between loss of surface resistivity and loss of resistivity through the insulation.

In the illustration I cited a minute ago, where paraffin blooms to the surface, fungi attacks the surface. In electronic equipment that is very important, and as a result, much of the electronic equipment has to be fungus-proofed for use in the tropics.

On the other hand, we have or can have a vigorous growth of fungi on the surface and yet if the body of the insulation is not susceptible, the resistivity through the wall of insulation may stand up nicely. It is the terminals that cause the trouble.

A Member: Is it possible to compound GR-S so that it is resistant to this fungus attack that you described?

Dr. Blake: Yes. It is not easy, but it is possible and is being done.

A Member: How did you manage to plate your copper on rubber there?

Dr. Blake: We used rather low current densities and took a long period of time. If you try to use higher current densities, these micro pores, if you want to call them that, fill up with hydrogen through the decomposition of the water and stop the decomposition there. We had a lot of failures but we had some successes.

A Member: Can you give us any idea of the plates and plasticizers which are consumed in the work?

Dr. Blake: Polymeric plasticizers are pretty resistant. Some of the other esters are susceptible. DOP is not too bad.

Chairman Whitney: Are there further questions? Thank you very much Dr. Blake, for an excellent talk here. We certainly appreciate it. (Applause)

As I said before, our program has three widely divergent types of subjects this morning, each one of considerable interest to everybody in the wire industry.

The design of proper equipment and its proper application is certainly one of the major factors and we have with us this morning, H. A. Dickerson, Application and Project Engineer, Control Engineering Department of Westinghouse Electric Corporation of Buffalo, New York. Mr. Dickerson will speak on the subject of, "Electrical Motors and Control for Slip Type Wire Drawing Machines." Mr. Dickerson.

(Mr. H. A. Dickerson delivered his prepared paper entitled, "Electrical Motors and Control for Slip Type Wire Drawing Machines.") (Applause)

Chairman Whitney: Well, as you can see, that is a very extensive subject to cover in the time that was available here. Mr. Dickerson's paper covers that in detail. He was under somewhat of an handicap in trying to condense it and present it to you in as complete as possible manner.

I think we are running a little short of time and I would suggest that any questions that you might have, that you talk directly with Mr. Dickerson afterwards. I am sorry we don't have time for a question period.

There are some copies of this talk, the complete talk that Mr. Dickerson gave, available over here at the end of the table and you may pick them up at the end of the meeting.

I will take very little time to introduce the next speaker. He will talk to you on a very unusual and very interesting subject. I will introduce Frank R. Nichols, President of the Nichols Wire and Aluminum Company of Davenport, Iowa, who will speak on, "The Properzi Process for Continuous Casting and Rolling of Aluminum Redraw Rod."

Mr. Nichols: Thank you very much. I am certain there are a number of questions that various people are going to want to ask and as a consequence, I will be brief.

I regret this paper could not be published in the current issue of "Wire and Wire Products," but they have kindly permitted us to publish a preprint, copies of which are available for distribution as you leave or during the meeting, whichever is convenient.

After I speak, Mr. Properzi has a few comments to make in Italian, which I will translate, and as I say, we will go through this promptly so whatever questions you might have, we will try and answer them.

(Mr. Nichols read his prepared paper.)

Chairman Whitney: I think it would be very much in order at this time for the gentleman who is responsible for this process to say a few words which will be translated later.

I would therefore like to introduce Mr. Properzi. (Applause)

(Mr. Properzi made an address in Italian, the translation of which appears below.)

Mr. Properzi: I am grateful for the more than generous introduction Mr. Nichols has just given me. Perhaps I can justify it by offering a brief glimpse of the future.

Development of continuous casting and rolling processes, already perfected for aluminum, zinc and lead redraw rod, should assure the continued growth of the metal industry throughout the world for a number of decades.

Such processes, indeed, may so greatly improve the competitive position of metals, against other materials, by reducing the basic cost factor of labor and investment, as to create an Age of Metals beyond anything known or foreseen to date.

The reasonable expectation is that the cost of finished metal products may be stabilized, despite the long-range inflationary trend, because of the economic by-products of continuous processes, namely:

1. Greatly lowered investment, opening the way for much broader competition in metals, from processing to fabrication.

2. Greatly increased productivity of labor, permitting good wages without proportionate increases in the cost of products, and

3. Greater stability for the metals industry by reductions in the cost burdens of idle time, permitting profitable operation even in the absence of peak consumer demand.

The first commercially practical continuous process is the redraw rod casting and rolling equipment developed in Milan, Italy. Our process is in worldwide use for aluminum today, but it is admittedly only a first demonstration that the era of continuous processes for metals is near at hand.

This era left the dream stage only a decade ago when our process was perfected for lead redraw rod. The era is, thus clearly in its infancy, but it is equally clear that the infancy will be relatively brief.

The Properzi Process, itself, has undergone great development in the few years since the war, and it is well known that other processes for flat-rolled products in aluminum and steel are in varying stages of advanced development now.

As an example of what lies ahead, the Properzi Process makes it possible to produce higher quality aluminum redraw rod, which is increasingly important as an electrical conductor, directly from ingot, for an investment of about $175,000, with a labor force of three. A motor of only 100 horsepower rating is required.

When this is compared to the multimillion dollar plants needed for conventional production of rod, and to their large labor forces and to the many thousands of horsepower therein required, it becomes obvious that continuous processes are revolutionary in their economic import, and are not merely another step towards increased efficiency of production.

Viewed in the perspective of the next fifty years the present development of continuous casting and rolling processes seems to become more and more important both for metals and to the consumers of metals.

The promise of continuous processes is, after all, one of stability for metals cost in the face of general inflationary trends, putting metals into a best buy category increasingly with the passage of time. (Applause)

Chairman Whitney: I would like to take this opportunity to express to Mr. Properzi our appreciation of his taking the time to be with us at our convention and to explain in his own way, the marvelous contribution he has made in the field of metallurgy.

The floor is now open for questions. I am sure that this discovery and new process here will bring up a number of different questions and Mr. Nichols has very kindly consented to answer them.

A Member: What experience have you had in casting the aluminum alloys and if you have done so, what is the problem of the alloying constituents?

Mr. Nichols: The progress with respect to aluminum alloys has been slow. The development of the machine has been done primarily for high purity metal. We are keenly interested in being able to produce aluminum alloys ourselves.

The solidification range of alloys is broader than is the solidification range of pure metal. The techniques involved in casting, therefore, are more complicated than they are with high purity metal. The fact that alloys are considerably harder, have required strengthening the rolling mill.

In the past, we have conducted a number of experiments with a view towards rolling alloys. The rolling mill needed to be beefed up, and at the present time, that is in process. The Type 5-A rolling mill should be satisfactory for the production of some of the alloys, 60's, 52's. We do not think that 56's, for example, will be possible. We don't think 24's will be possible, but some of the softer alloys, we believe we will make progress within the immediate future.

A Member: How about a-17-S?

Mr. Nichols: I can't tell you about that. We have conducted no experiments.

A Member: You mentioned in your paper—does that mean the area of the rod was .250?

Mr. Nichols: I mean the cross-section area. That was the first machine that was developed.

A Member: What was the capacity of your machine?

Mr. Nichols: With a Type 4 machine we currently are casting at a rate of slightly in excess of 1600 pounds per hour.

A Member: I mean capacity as to diameter.

Mr. Nichols: You mean the finished rod. You can take it off at any rod pass. We finish at 9/32. The practice in the electrical conductor wire industry is to finish at ⅜, and the standard for redraw rod is ⅜. For ⅜ redraw rod, this is the 13th stand.

On the Type 5 section, which is the 1.2 square inch area, that will come off at the 11th stand on the Type 4 section, approximately ¾ of a inch square comes off at the 9th stand.

A Member: What if you have one to take off a half-inch in diameter?

Mr. Nichols: That could be done. You get to a point where it relates itself to practicality. If there is any substantial requirement for half-inch, then it can be done. So far, we have not had any particular requirement for large rods.

A Member: Do you find any development of aluminum oxidizing in the melting pots? Do you have difficulties there that have to do with the flow of aluminum?

Mr. Nichols: The practice that is used by every company in the country, with the exception of ours and Alcoa, involves the use of a large Ajax furnace which casts so many tons of molten metal per hour. This furnace can be positioned very close to the casting machine so that there is no long transfer of metal in the open air. Flowing aluminum forms an oxide skin that as a matter of fact looks as though it is running through a sock, and is referred to as a sock, which protects the molten running metal from further oxidizing that forms an outside coating as it pours through.

Now, the metal is bottom cast in the Properzi process and by proper skimming, by proper use of sieves, if that is the word, you can eliminate dross and getting oxide into the casting itself.

A Member: I have heard in some of those furnaces, the lumps form on the side. I wonder if you had gotten away from that or if in the type of furnace you have no lumps on the side you have to dig away?

Mr. Nichols: You have ordinary furnace maintenance. I am not a furnace expert. I had hoped that Manual Tama could be here today, but he is not here. But, I will say this, that since this process has come into use, that the proper type of furnace lining has been made by Ajax to eliminate silicon pickup. Now, with any kind of furnace, you have problems of keeping it clean on ordinary maintenance. Specifically what those problems are, I can't tell you.

A Member: Are there any No. 5 operation machines in this country today?

Mr. Nichols: Yes, at Southwire and I might say this, that all of the Type 4 machines are now being converted to the Type 5 sections and that also is an interesting thing, as I pointed out a while ago. At the present time, ⅜ redraw rod, which is the diameter that the customer customarily used with the Type 4 cross section, has a cross section of ¾ of an inch, that comes off at the 9th pass, but for the Type 5, the way the conversion is accomplished, a larger group is put into the casting and then the larger casting produced is accommodated by taking or putting two larger passes at stands 1 and 2, and all the rest of the passes are moved down, so that with the Type 5 cross sectional area, ⅜ finishes at the 11th stand instead of at the 9th.

A Member: How long are these cast?

Mr. Nichols: You can cast whatever you want. It is just a question of your handling equipment. You get a ton an hour. You can cast a continuous bundle of a ton or ten tons or whatever you want to. I mean it is a truly continuous process.

A Member: Does the Number 5 produce more tonnage per hour than the Number 4?

Mr. Nichols: Yes, it does. The Type 5 cross section, that is the larger cross section. This is the Type 5 and this is the Type 4. (Showing samples.) The tonnage, I speak conservatively, including all down time, such changes as are necessary of the belt and spouts and so on, was 1200 pounds per hour. Actually, we are producing with the Type 4 machine approximately somewhere between 1400 and 1500 pounds per hour in the regular course of business. That includes all down time. The Type 4 cross section is conservatively estimated at 1600 pounds per hour. The actual potential is considerably greater, a minimum of a ton per hour is a safe

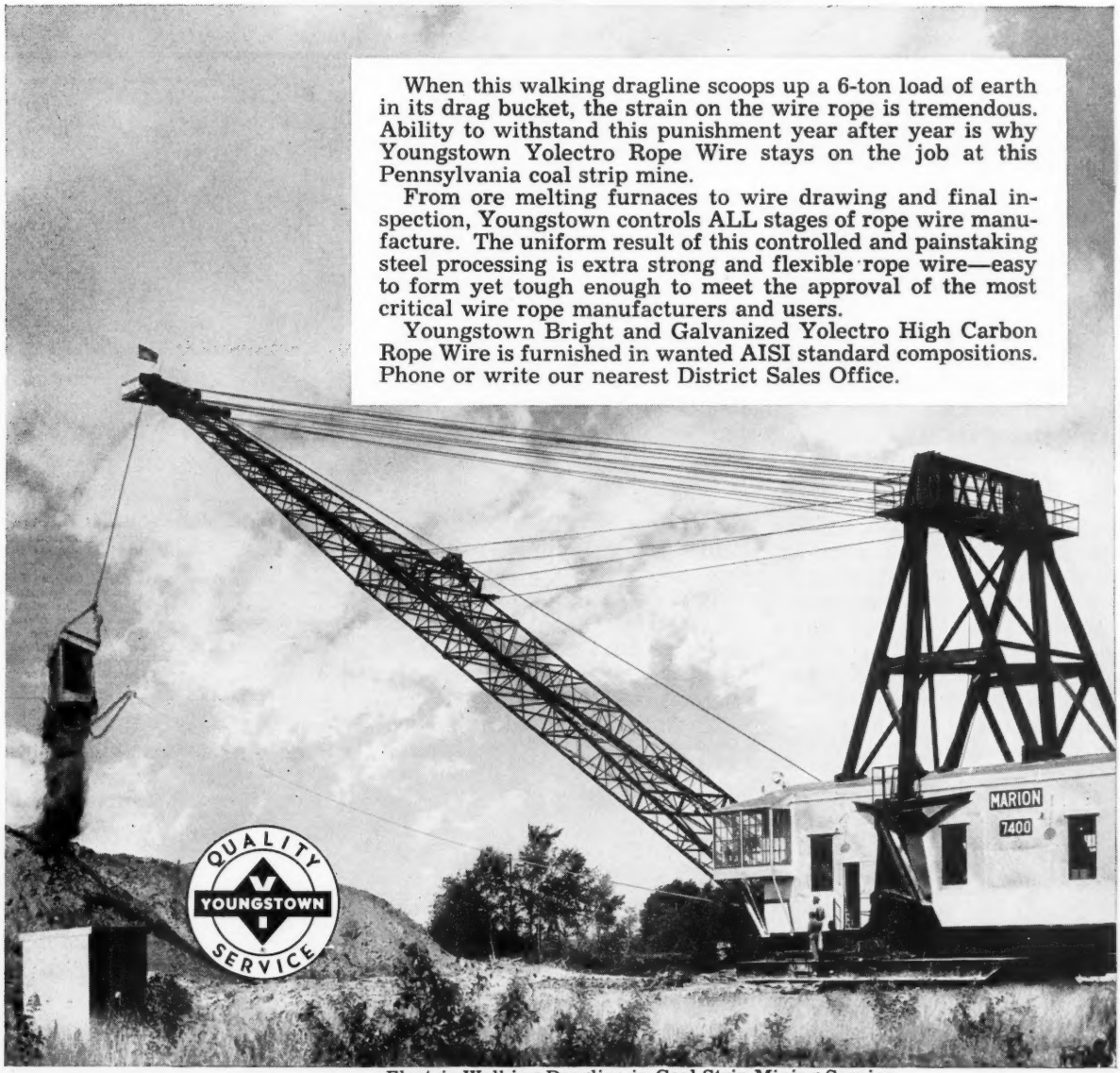
(*Please turn to page* 106)

Wire Rope From Youngstown Yolectro Rope Wire Proves Extra Strong in Service

When this walking dragline scoops up a 6-ton load of earth in its drag bucket, the strain on the wire rope is tremendous. Ability to withstand this punishment year after year is why Youngstown Yolectro Rope Wire stays on the job at this Pennsylvania coal strip mine.

From ore melting furnaces to wire drawing and final inspection, Youngstown controls ALL stages of rope wire manufacture. The uniform result of this controlled and painstaking steel processing is extra strong and flexible rope wire—easy to form yet tough enough to meet the approval of the most critical wire rope manufacturers and users.

Youngstown Bright and Galvanized Yolectro High Carbon Rope Wire is furnished in wanted AISI standard compositions. Phone or write our nearest District Sales Office.



Electric Walking Dragline in Coal Strip Mining Service
at Buckeye Coal Co., Grove City, Pa.

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Fatigue Properties of Music Wire and Springs

This is a summary of Technical Report No. 1808 furnished by the National Bureau of Standards. It is interesting in that it describes a new reverse bending analysis method for predicting the fatigue strength of springs made from music wire.

An investigation of the fatigue properties of music wire and springs, which is now under way at the **National Bureau of Standards,** has resulted in the development of a reversed bending analysis method for predicting the approximate fatigue strength of helical springs wound from music wire. The study, which is being conducted by **J. A. Bennett, H. C. Burnett** and **C. L. Stangaitis** of the NBS mechanical metallurgy laboratory, has also yielded information about the mechanism of failure of wire springs.*

★ ★ ★

Many ordnance devices such as machine guns and small arms are dependent on helical springs for their operation. These springs operate over a very large stress range and must maintain their original strength through thousands of cycles. Music wire is most frequently used for springs in ordnance devices because it is the strongest engineering material available. Small-diameter wire of this type is produced commercially with a tensile strength as high as 450,000 pounds per square inch. The reversed-bending study, made on four types of wire, is the first phase of the Bureau's investigation of helical springs. The work is sponsored by the **Army Ordnance Corps.**

★ ★ ★

In the NBS investigation reversed bending fatigue studies were made using two types of testing machines. One of these was designed and constructed at the Bureau; the other was the Hunter wire fatigue tester. The NBS machine utilizes a rotating strut but differs somewhat from other machines of this type. Both machines operate on the principle

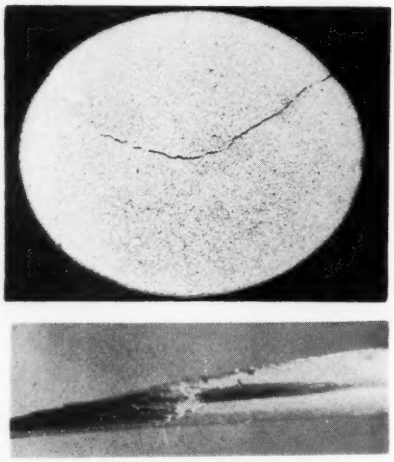

Figure 3 a & b—A cross section of a spring that failed in the NBS study shows a fatigue crack which developed along longitudinal planes in the wire. The section is some distance from the fracture. The study showed that initial fatigue failure of the compression springs occurs on longitudinal planes of maximum shear stress in the wire. (a) The crack progresses for some distance along the wire before a crack normal to the tensile stress is started. (x50). (b) Typical fracture of helical compression spring wound from music spring wire, indicating plane of tensile fatigue cracks.

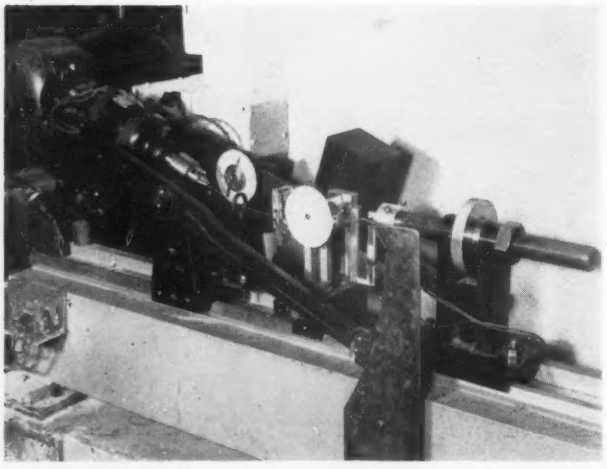

Figure 1.—Fatigue testing machine developed by NBS for reversed bending analysis of pieces of straight music wire. The specimen is mounted in the motor chuck and a pivoted tailstock bearing. The tailstock bearing is free to move horizontally on flexure plates, one of which can be seen. An axial load is applied to the specimen by the loading nut and is measured by the dynamometer which incorporates wire strain gages. When the curve of the specimen is made symmetrical by setting the angles at the two ends equal (as read on the protractors), then the bending moment is equal to the axial load on the specimen times the deflection from the line joining its ends. After proper adjustment, the wire is rotated until the specimen breaks, which automatically stops the machine. * * * *

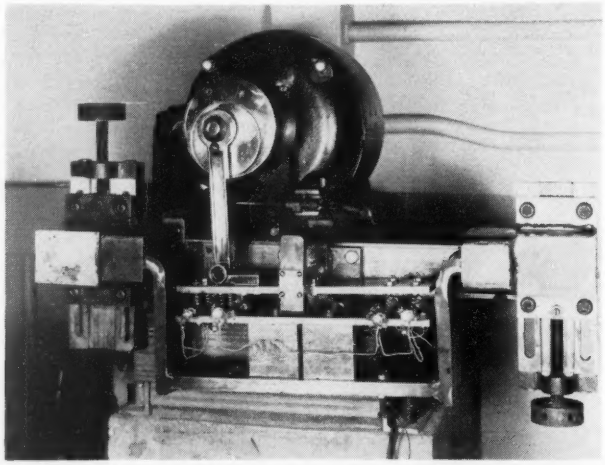

Figure 2.—Fatigue studies of short compression springs were made on a machine also developed at NBS. In this device the motor and adjustable eccentric from a Krouse plate bending machine were utilized, allowing eight springs to be stressed simultaneously at two levels. Stress levels are computed by measuring the change in pitch of the spring when in the no-load, minimum-load, and maximum-load positions. Electrical contacts stop the motor if any specimen fractures. * * * * * * * *

that a rotating curved wire must reverse its points of maximum compression and tension once each revolution. Approximately 50 specimens of four types of wire were studied under reversed bending in the Hunter machine, and 100 specimens of each type in the NBS machine. When results from the two machines were correlated, no consistent difference in data was found.

★ ★ ★

Fatigue studies of short compression springs were made in another type of machine designed at the Bureau. In this device an electric motor and adjustable eccentric are attached to one end of a steel plate which is pivoted at its midpoint. Eight springs, four at each end, are mounted between the pivoted plate and a second fixed plate approximately two inches below. The four springs at each end are positioned at the corners of a theoretical square. This permits the eight springs to be stressed simultaneously at two levels. Stress levels are computed by measuring the change in pitch of each spring when in the no-load minimum-, and maximum-load positions.

★ ★ ★

In order to provide a comparison between the results of the reversed bending studies and the compression tests, the data obtained were used to prepare tables that give, for various life times, the ratio between the stress range in the springs and the stress amplitude in the wire. These turned out to be similar for all of the four types of wire tested. The NBS data indicate that reversed bending fatigue analysis of music wire will give the approximate fatigue strength at high stress levels of helical springs wound from that wire. However, the correlation was not sufficiently good to differentiate between samples of similar wire.

★ ★ ★

In the course of the investigation a study was made of the mode of fracture of the springs. In a helical spring loaded in tension or compression the wire is actually twisted. Consequently, there are shear stresses in the wire which are parallel and perpendicular to its length, and the tensile stress is at an angle of 45° to these. Observation of the fractures showed that in almost all cases a fatigue crack had started on a longitudinal shear plane and progressed for some distance along the wire before a crack normal to the tensile stress started. Fracture of the wire occurred when the tensile crack had progressed only a short distance. These observations were verified by microscopic examination of a cross section of the wire taken from a fracture. The discovery that fatigue cracks start on a longitudinal shear plane explains one type of failure experienced in machine gun springs, where the strength of the springs decreases greatly without actual failure.

* Endurance of helical springs related to properties of the wire, H. C. Burnett, C. L. Staugaitis, Metal Progress Vol. 64 (September 1953).

A BOOK EVERY WIRE MAN SHOULD OWN AND READ...

"STEEL WIRE IN AMERICA"

written by Kenneth B. Lewis, as only he could write. This remarkable book treats of the various operations in wire making, giving the history and theories underlying each process, tracing the development of machinery, equipment and supplies used in the industry, and naming those individuals and companies involved in the evolution of our industry to its present stage of development. A highly readable treatise. You'll like it!

The book, sponsored by the Wire Association, is an unusual contribution to the literature on the art of making wire. It is not a handbook nor reference work, but is one that will bear much reading, re-reading and study. Any wire man will be better equipped for his work through a knowledge of the contents of Mr. Lewis' book.

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Government Wire Production Information

New Copper Contract

A contract designed to yield 18,700,000 pounds of refined copper for delivery to the Government through 1955 has been signed with the **Howe Sound Company** of New York, it has been announced by the Administrator of General Services.

★ ★ ★

The agreement provides that the company will produce ore from its "high cost" Holden Mine, located in Chelan County, Washington, and will arrange with a qualified smelter to process the ore.

★ ★ ★

The Government will pay 31½ cents per pound, f.o.b. common carrier's conveyance at any points within Washington, Oregon, California, Nevada, at Government option.

★ ★ ★

Terms of the agreement call for production of 9,020,000 pounds on or before December 31, 1954 and 9,680,000 pounds during calendar year 1955. The agreement automatically ends December 31, 1955 or earlier if the full production has been achieved.

★ ★ ★

In June of 1952 the Government signed an agreement with the same company for production at Holden of up to 8,834,000 pounds of electrolytically refined copper which, due to high cost factors, was to be supported at a price of 28.9 cents per pound, or 4.7 cents per pound over the then ceiling of 24.2 cents. The price was later increased to 32.54 cents per pound.

★ ★ ★

That agreement terminated automatically when copper was removed from price controls on February 25, 1953. More than 5,500,000 pounds had been produced.

★ ★ ★

Since the termination date of the previous agreement, the company has been operating the mine without a Government contract, but cannot continue to do so without this arrangement. A determination on the part of the Government that it is necessary to insure the continued production of copper for defense needs resulted in the current contract.

Marking Requirements for FOA-Financed Commodities

All commodities, and their shipping containers, furnished to participating countries under FOA-financing (whether from the U. S. or other source country), must now carry the official FOA emblem designed for the purpose. This

MICROMETER PRECISION — MICRO-WELD — TRADE MARK REGISTERED

MODELS J-3-S and J-4-S AUTOMATIC MICRO-WELD BUTT WELDERS

These welders are used for welding high and low carbon STEEL, and STEEL ALLOY wire, ranging in size from .020" to .160" diameter. All operations on these units, which include the clamping of the wire being welded, contacting the welding switch, and upsetting the weld, are made by a single downward stroke of the foot pedal. Welders for high carbon steel wire are equipped with the exclusive MICRO-WELD Dial indicating annealing device to facilitate the annealing operation of high carbon wire.

Standard equipment with these units include annealing dies, filing vise, light extension cord, and mounting on a 4-wheel truck. Special units can be furnished for crane mounting.

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identification may be affixed by metal plate, decalcomania, stencil, label, tag, or other means, depending upon the type of commodity or shipping container and the nature of the surface to be marked. The emblems placed on the commodities should be approximately as durable as the goods themselves; the emblems on the shipping containers must be legible until they reach the point of destination.

★ ★ ★

The size of the emblem may vary depending upon the size of the commodity, package or shipping container to be marked, but should be large enough to be clearly visible at a reasonable distance; wherever possible, the height of the emblem on the shipping container should be at least twice the height of the lettering used in the shipper's marks. In addition, the shipping container will indicate clearly the last four digits of the FOA procurement authorization number and the name of the participating country, in characters at least equal in height to the shipper's marks.

★ ★ ★

The emblem will appear in the colors shown on the samples available in the Office of Public Reports, Foreign Operations Administration, Washington 25, D. C.

★ ★ ★

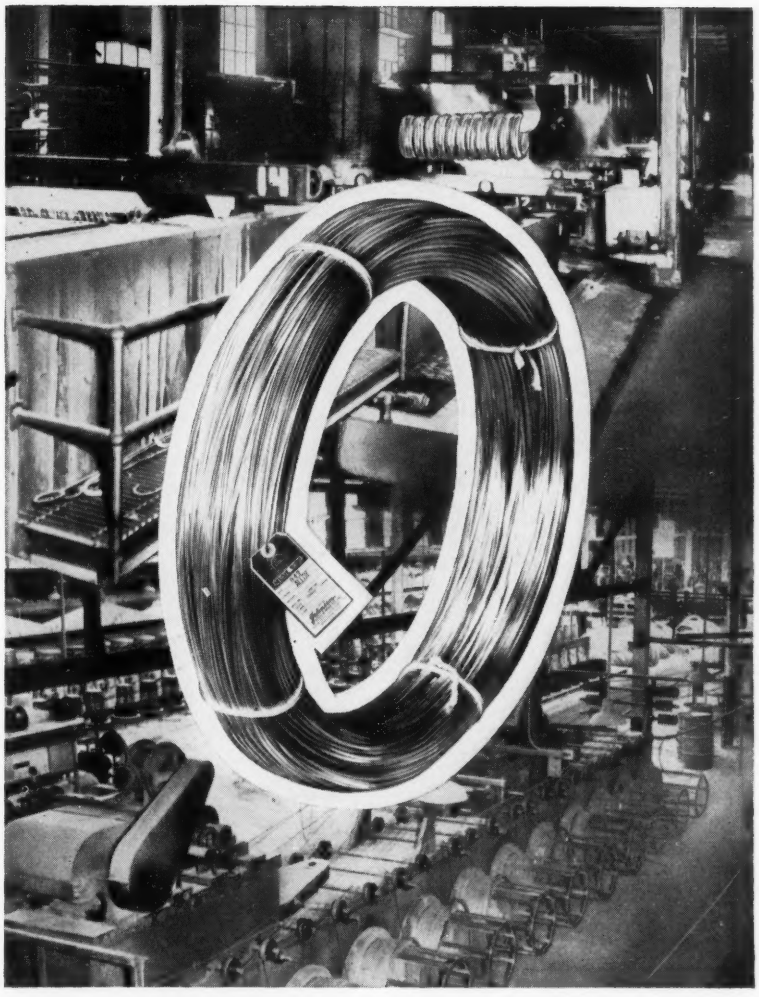
If compliance with the provisions of this section is found to be impracticable with respect to other commodities, the participating country or supplier will promptly request the Office of Public Reports, Foreign Operations Administration, Washington 25, D. C., for an exception from these requirements.

Office of Small Business in New Location

The merger of the Mutual Security Agency, the Technical Cooperation Administration, and the Institute of Inter-American Affairs into the Foreign Operations Administration has now been completed.

★ ★ ★

On Saturday, November 21, the



Inflation: a cockeyed economic condition that makes the prices you get look good and the prices you pay look awful.

Inflation has affected the wire making business just as it has all other industries. But the upsurge in the cost of raw material, handling, labor and everything else along the line has been to us a challenge. Here at Johnson, through improved manufacturing, we have been able to meet inflation part way, with the result that our high quality Music Wire, the largest manufacturing item in our specialized industry, has advanced in price less than many other commodities that have zoomed since jet planes passed speed of sound, approached speed of gossip.

JOHNSON STEEL AND WIRE COMPANY, INC.

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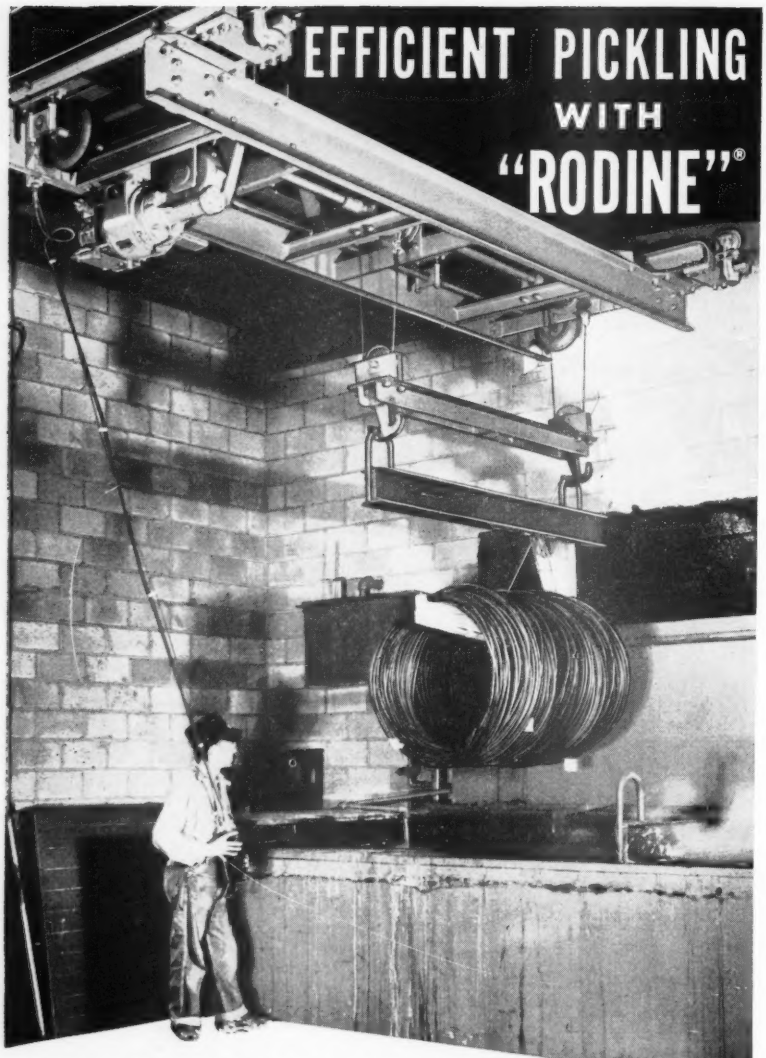
Chicago Atlanta Houston Tulsa Los Angeles

A SUBSIDIARY OF PITTSBURGH STEEL COMPANY



Photograph of pickling installation at Lake Erie Screw Company, by courtesy of The American Monorail Company, Cleveland, Ohio.

Rod and wire are pickled clean in "Rodine"-inhibited acid without waste of either acid or metal. Breakage in drawing, from acid brittleness, is minimized.

Wire and rod, pickled with "Rodine", as compared with less effective inhibition, are larger in diameter, and when drawn to the finished gauge the coils are longer and correspondingly heavier.

"Rodine" more than pays for itself in savings of acid and metal.

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FOA Office of Small Business moved its offices from 811 Vermont Avenue to 806 Connecticut Avenue, and is situated in Room 1216. While the location is listed for the convenience of visitors, the **mailing address** remains the same: 815 Connecticut Avenue, Washington 25, D. C.

★ ★ ★

The telephone number—STerling 3-6400—remains unchanged, and individual telephone extensions are as follows:

Charles A. Richards, Director
Office of Small Business—2676

Margaret R. VanCaster, Secretary—2676

Henry G. Holle, Chief
Exporters Service Branch—2356

Julia Castleman, Chief—3112
Foreign Trade Opportunities Branch—2370

Government Aiding Small Business

An intensive effort to bring to small business concerns complete information about pending Government purchases of civilian-type goods and other services and assistance available to them, was announced recently by the General Services Administration and the Small Business Administration.

★ ★ ★

Edmund F. Mansure, Administrator of GSA, and **Wendell B. Barnes,** Acting Administrator of SBA, said in a joint statement that the two agencies will undertake a full interchange of information about their respective programs so that the field representatives of either agency will be able to tell business concerns what GSA is buying and what SBA is doing to assist small firms.

★ ★ ★

"It is our mutual objective," the two agency heads said, "that doing business with the Government be made as simple as possible. Since we both have programs affecting small business, it is logical and of benefit to the inquirer that all information about what both agen-

cics are doing be made available with only one visit by businessmen to either of us."

★ ★ ★

The agency heads said that another step, being planned for the future is actually to house the information aspects of both under one roof. Certain technical problems must be worked out before this is done, but so that no time is lost, the interchange of information between the two will begin at once.

★ ★ ★

GSA today operates Business Service Centers in 11 cities. These maintain for public inspection copies of all current bid invitations issued by GSA. They also supply free of charge, single copies of Federal Specifications relating to current bids of any agency, and serve as contact points for general information on all types of Government buying.

★ ★ ★

SBA has 30 field offices across the country to carry on the agency's activities in local areas. SBA's major programs consist of helping to meet the financial needs of worthy small business enterprises, assisting them in getting a fair share of Government purchases of goods and services, and providing them with management and technical assistance.

★ ★ ★

Under the new program, GSA also will begin advising SBA of current bidding activity on a regional basis. For example, the GSA office in Denver will supply SBA representatives in the Rocky Mountain area with bid information, as well as basic facts which will be helpful to firms seeking Government orders of civilian-type goods.

★ ★ ★

SBA field offices will, upon request from GSA, make surveys and recommendations as to the competency of individual small firms bidding on GSA purchases of goods and services.

3 ways *Solar* solves a sales problem... IN YOUR FAVOR

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1 GREATER SALES APPEAL!

Gray Soldura gives the buyer visible evidence that the flameproof compound on non-metallic sheathed cable and service entrance cable is completely sealed and covered. Moreover, it camouflages service entrance cable used on white houses and forms an excellent base for the subsequent application of house paint.

2 STAYS CLEANER!

Gray Soldura *looks* cleaner because it *is* cleaner. It's used with a clear wax top dressing (which makes it easier to pull through joists or fish through conduits) and will not mark up walls during installation. Workmen's hands stay cleaner, too.

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FOR GREATER SALES APPEAL... FOR CLEANER APPEARANCE, EASIER HANDLING, AND FREEDOM FROM STICKING OR FLAKING... USE SOLDURA... THE GRAY WIRE COLOR SOLUTION THAT BUILDS SALES.

SPECIFICATIONS*

Weight per gallon	15-16 lbs.
Total solids	75-80%
Viscosity, Gardner Mobilometer @ 77°F., 250 grams load	15-20 seconds
Estimated coverage—Sq. Ft. per gal.	1250-1500
Number of coats recommended	Two, for best results
Colors	Light, medium and dark gray

**Gray Soldura is soluble in alcohol, acetone, and common lacquer solvents, but is not soluble in gasoline and petroleum solvents.*

FOR SPECIFIC INFORMATION ABOUT GRAY SOLDURA MS-551 AND A COMPLETE REPORT ON OUR LABORATORY TEMPERATURE TESTS, WRITE TO SOLAR COMPOUNDS CORPORATION.

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PEORIA 7, ILLINOIS

ABSTRACTS

PREPARATION OF THIN TUNGSTEN FIBRES AND THEIR USE IN PLACE OF QUARTZ.
J. O'M. Bockris, D. F. Parsons (Imperial Coll Sci & Technol, London). Journ Sci Instr 1953 Vol 30 (9) p 340 (Sep).

Uniform tungsten fibres of about 3 micron thickness produced by reduction of die-drawn 12-13 micron thoriated tungsten wire by AC electrolysis. Wire held in aluminium spool turning on glass rod lubricated by light oil was passed beneath Perspex pulleys immersed in glass vessel containing 2.5 N NaOH solution, onto spool connected to electric motor. Rate of drawing varied from 0.2 to 1 m/mim. AC entered thick end of wire by mercury globule, copper gauze serving as other electrode. Dissolution and electropolishing of tungsten occur simultaneously with passing of 25 mA current. Dia reduced to 3 micron in 3 or 4 runs. Thinner fibres may be obtained; precautions to reduce friction and vibration required. Fibres used as suspension wires; higher tensile strength than quartz, less brittle; may replace quartz for dia suspensions up to 6 micron. 1 illustr, 3 ref.

THE MANUFACTURE OF DIAMOND DIES.
Brit Diamond Wire Die Co. Wire Ind 1953 Vol 20 (237) pp 873-875 (Sep).

First patent for diamond dies taken out by W. Brockedon, 1819, but no evidence of application. Diamond dies first made in England in 1893 by J. R. Simpson, founder of Co. Distribution and selection of die stones. Five phases of manufacture described: flatting on scaife; drilling by needle charged with diamond powder; counter piercing with diamond splints; polishing, ie blending angles of drilled hole by lapping on horizontal and vertical needle and wire type machines, using successively finer grades of diamond powder; and mounting. Small dia dies mounted in brass cases; steel cases for hot drawing of tungsten or molybdenum. Dies over 0.006 in. reinforced in steel slugs and mounted in brass cases. Prior to drilling, diamond embedded in steel under pressure for max strength and resistance to bursting. Die maintenance: dies should be removed periodically, washed in de-greasing agent, cleaned with a wood point, and examined. Wear usually indicated by 'drawing ring.' Dies worn out of tolerance should be opened to next size, maintaining die profile. Diamond powder must be applied frequently in small quantities. 9 illustr.

NON-FERROUS WIRE PRODUCTION.
R. Johnson & Nephew Ltd. Met Ind 1953 Vol 83 (13) pp 255-258 (Sep 25).

History of Co; all phases of production described. Wire drawn to sizes from 0.006 to 0.252 in dia on machines having 21, 13, 9 and 5 dies. Practically all large dies for thicker wire are sintered carbide; diamond for finer sizes. Drawing coolant fed from central system to keep temp low. All dies made in Co's die dept; sintered carbide dies by powder metallurgy. Vertical and horizontal multiple spindle lapping machines used, especially on finer gauge diamond dies. Some hand finishing required; facilitated by pistol-type machines for lap oscillation. 8 illustr.

SONDERRECHENSCHIEBER 'DRAHT'.
'DRAHT' SPECIAL SLIDE RULE

F. Kohlhase. Draht 1953 Vol. 4 (9) pp. 340-342 (Sep) (In German)

Description, instructions and working examples of slide rule with special scales for immediate calculation with only one setting of (a) total reduction of cross-section in %; (b) mean reduction of cross-section at each stage in %; (c) number of stages; (d) initial and final dia.; (e) reference dia.; (f) tensile strength for any carbon-content between 0.1 and 1% and any specified total percentage decrease in cross-section; (g) strength after patenting; and (h) ratio of final to initial length.

The slide rule therefore combines practically all necessary calculations for multiple wire drawing. It is available from Draht, Prost & Meiner-Verlag. Postfach 691, Coburg, Germany, at a price of DM 65.00. 7 illustr, 7 ref.

ZEICHNERISCHE DARSTELLUNG DES ZIEHVORGANGS BEIM DRAHTZIEHEN AUF MEHRFACHZIEHMASCHINEN UNTER BESONDERER BERUECKSICHTIGUNG VON SCHLUPF, ANSAMMLUNG UND ZIEHSTEINAUFWEITUNG. GRAPHIC REPRESENTATION OF THE DRAWING PROCESS IN WIRE DRAWING ON MULTIPLE DRAWING MACHINES, WITH SPECIAL REGARD TO SLIP, ACCUMULATION AND DIE-WIDENING.
F. Liekmeir, Draht, 1953, Vol. 4 (8) pp. 290-293 (Aug.) (In German).

Examination of method suggested by C. Blazey and V. W. Benjamin as applied to multiple drawing machines working by (a) sliding, (b) non-sliding with accumulation (Ansammlung), (c) non-sliding without accumulation (straight drawing). Continuity of sliding mechanism leads to constant product of wire velocity v and cross-section q, ie q: v diagram is straight line on log-log scale. Hence v for given reduction in dia. immediately determined. But v must be chosen slightly larger to take account of die wear. Hence slip. Large slip increases die-wear but decreases its effect on wire dia. Only wear on final die critical; this is therefore periodically moved higher up the line. No continuity in non-sliding process with accumulation. v must be greater than given by diagram. Accumulation expressed as percentage a of ratio of accumulating to continuously running wire. Formula connecting q, v, a at each stage gives straight line on log-log scale. Non-sliding process without accumulation represents ideal case of continuity. Since neither slip nor accumulation, all q, v values lie on actual straight line. 4 illustr, 3 ref.

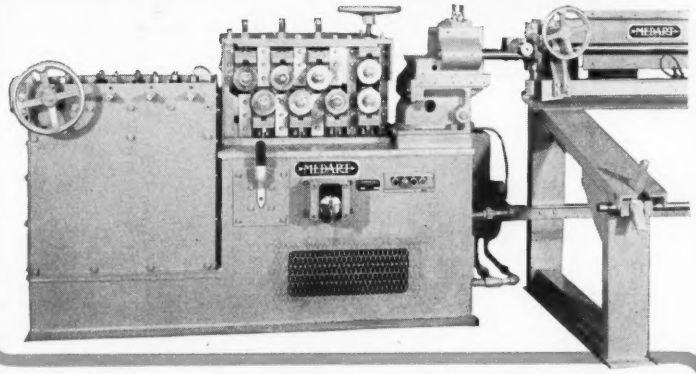
APPARELS D CONTROLE POUR FILIERES ET SIMILAIRES. CONTROL INSTRUMENTS FOR DIES AND SIMILAR TOOLS.
Anon. Usine Belge, 1953, Vol. 30 (1331) pp. 11-12 (Aug 22) (In French).

(a) Zetmeter of S. Werth and W. Lueg consists of sliding table on vertical stand with fixed lower and movable upper conical needles. Die mounted on table and lowered until lower needle enters die opening. Top needle then lowered to similar position and length of die channel read from dial gauges. Max. and min. radii of conical opening can be calculated from tables supplied. Accuracy 0.1 to 0.05 mm. depending on model. (b) Taper feeler measures angle of conical needles used for production of

Straighten Shaped Wire Automatically At Speeds Up To 250 FPM!

MEDART

Supermatic SHAPED WIRE STRAIGHTENER AND CUTOFF MACHINE



- Only machine of its type. Equipped with infinitely variable all-hydraulic drive. Throughput speeds adjustable from 100 to 225 f.p.m. with intermittent duty at 250 f.p.m.
- Hydraulic drive can be started or stopped instantly. Design of hydraulic circuits permits machine to be changed instantaneously from full speed forward to full speed reverse.
- Full automatic feed-through, straightening and cut-off, without attention from operator, after end of coil is started through pinch rolls.
- Hydraulic shear is completely automatic in operation, and is actuated by electric length-of-cut control adjustable for any predetermined cutoff length. Eliminates all swelling or expansion of workpiece. Machine can deliver a finished 12-ft. long piece of wire from coil every 3¼ seconds.
- All adjustments are made by fine pitch screws. All rolls in straightening section are adjustable to insure proper centerline pass of each shape of wire.

Write For Details

Supermatics for round wire 1/16" to 1" also available

THE MEDART COMPANY 3535 DE KALB STREET ST. LOUIS 18, MO.

You're "WIRED to SATISFACTION" when you specify SENECA

TOP QUALITY WIRE

for wide range of uses! Check your needs!

- ☐ Aircraft
- ☐ Armor
- ☐ Armature
- ☐ Bobby Pin
- ☐ Bobbin Ring
- ☐ Bookbinder
- ☐ Bottle Cap
- ☐ Broom
- ☐ Brush
- ☐ Cable
- ☐ Car Seal
- ☐ Core
- ☐ Cotter Pin
- ☐ Covering
- ☐ CurtainSpring
- ☐ Drapery Pin
- ☐ Flexible Shaft
- ☐ Florist
- ☐ Fuse
- ☐ Glass Netting
- ☐ Hair Pin
- ☐ Holly
- ☐ Hook & Eye
- ☐ Lock Spring
- ☐ Piano Covering
- ☐ Picture Cord
- ☐ Pin
- ☐ Piston Ring
- ☐ Plow Steel
- ☐ Reed
- ☐ Rope
- ☐ Safety Pin
- ☐ Shaft
- ☐ Spiral Binding
- ☐ Spark Coil Core
- ☐ Stapling
- ☐ Stitching
- ☐ Stove Pipe
- ☐ Strand
- ☐ Tag
- ☐ Umbrella
- ☐ Weaving

Whatever your needs in wire . . . whether it's fine wire for weaving or heavier types for springs, etc. . . . specify SENECA for *top quality* and *uniformity!* High carbon or low carbon steel wire . . . aluminum . . . bronze. Sizes No. 40 W & M gauge (.007) and larger. Many shapes—round, half round, oval, square, flat, straightened and cut. Choice of finishes—bright, soft annealed, coppered, liquor finish, tinned, bright galvanized, oil tempered, enameled.

Consult with Seneca for all needs in High Quality Wire.

Seneca

WIRE & MFG. COMPANY • FOSTORIA, OHIO

Representatives in practically All Principal Cities

sintered carbide dies. (c) Panohol optical instrument for circular examination of surfaces by means of conical mirror moving vertically inside opening. 6 illustr.

METHODS OF WIRE PRODUCTION.
K. V. Aiyer, Indian Inst. Met. Trans., 1951, Vol. 5, p. 95; Journ. Sci. & Ind. Res., 1953, Vol. 12A (8) p. 396 (Aug).

THE NEW BISRA PROFILOSCOPE.
Brit. Iron & Steel Res. Assoc. Ind. Diamond Rev., 1953, Vol. 13 (155) pp. 223-224 (Oct.)

New instrument using optical reflexion method. In addition to known principle, die holder is tilted until original circular image changes into a cusp shape. In this position, tilting angle can be read on protractor, giving indication of size of die dia. 4 illustr.

A METHOD OF MEASURING THE SURFACE TEMPERATURE OF A WIRE DURING DRAWING.
S. Z. M. Kopczynski, J. S. Hoggart, Australes Eng 1953 pp 75-78 (Apr 7); PERA Bull 1953 Vol 6 (9) p 523 (Sep).

Method using composite steel-constantan die described, together with typical results. 10 illustr.

THE DRAWING OF ZINC-COATED STEEL WIRE
K. I. Tulenkov, N. V. Sokolov. Blank dlja Sajawok 1953 Vol 2 (14) p 281 (Apr) (Original in Russian)

Book, Metallurgizdat, 80 pp. New process for production of zinc-coated wire, ie drawing of steel wire with zinc coat, described. Particulars of new methods and its advantages; results of theoretical and practical investigations.

These abstracts have been prepared by and are published through the courtesy of the Industrial Diamond Information Bureau, 32, Holborn Viaduct, London, E.C. 1, Eng. Inquiries regarding them should be directed to the Bureau.

Technical Bulletin on Enamel for Magnet Wire

Dow-Corning Corporation, Midland, Mich., has issued a technical bulletin on "Dow Corning 1360 Wire Enamel Properties and Applications."

★ ★ ★

This enamel is exceptionally heat stable and water repellent and has physical properties that compare favorably with organic base wire enamels. In addition it is resistant to attack to a large variety of acids and solvents. Its properties emphasized at elevated temperatures and will retain good insulating qualities at temperatures in excess of 275°C. Extended periods of service at temperatures ranging from 150 to 250°C are said to have little effect on the enamel.

★ ★ ★

Copies of the bulletin are available. Please write to the Dow-Corning Corporation for one.

New Rubber Processing Resin Announced

A new synthetic rubber processing resin with characteristics specifically tailored for maximum value to rubber compounders and users, has been made available to industry and recently announced by E. M. Paschall, President of Solar Compounds Corp., Linden, N. J.

★ ★ ★

Physical and chemical properties of the new compound, known as Solarite Resin #11, include: high compatibility with natural rubber GR-S, Butyl, Neoprene and other synthetics; easier incorporation, dispersion and processing without "mushiness"; maintenance of flexing characteristics despite severe ageing or exposure to ozone; suitability to pure gum or highly loaded stocks; and excellent electrical characteristics. In addition, stocks processed with Solarite Resin #11 possess marked freedom from scorching and bin-curing, and maintain viscosity over extreme temperature variations.

★ ★ ★

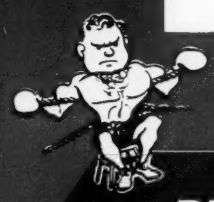
Although it is a synthetic hydrocarbon resin, one of the most interesting properties of Solarite Resin #11 is its close structural similarity to natural rubber. This similarity has been investigated through Infra-Red Spectrophotometer measurements. The transmission curves for Resin #11 are in essential agreement throughout with those for natural rubber. The opinion therefore has been expressed that the new compound might be considered more as "fossil rubber" rather than a resin as generally known and accepted.

★ ★ ★

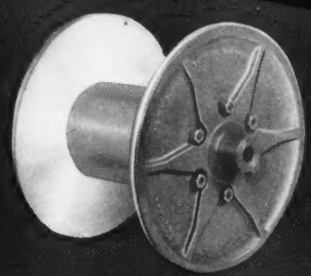
Solarite Resin #11 will be available in large quantities from freely available domestic source materials. The new compound will also interest management from the viewpoint of long range planning on raw material availabilities, since desirable coal tar resins are in shorter supply while the steel industry makes greater use of its own by-products, and petroleum or natural gas resins might be affected in the event of an international crisis.

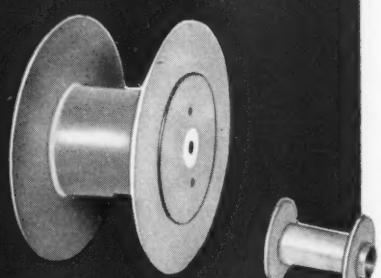
a name that has stood for sturdy, dependable yarn beams in the Textile Industry for over 20 years . . .

MILTON MACHINE offers you A RELIABLE SOURCE OF



RUGGED STEEL HEAVY DUTY PROCESSING REELS





HEAVY DUTY REEL

Shown at left is one of several wire rope or cable reels designed and manufactured over the past several years to meet the heavy duty service of a wire rope manufacturer. Flanges with rope brake rim grooves are heavily ribbed semi-steel castings.

WELDED STEEL REEL

At left is one of several welded reels made to wire rope manufacturers' specifications for replacement of light weight pressed steel reels which failed to hold up under heavy duty service.

SOLID STEEL PROCESSING SPOOLS & BOBBINS

Another of our products for the unusual service applications of the wire industry.

INQUIRIES INVITED . . .
Send us a sketch or print stating the limiting dimensions and services required—or write or phone. Our field engineer-representative will be glad to describe our facilities for supplying you with special heavy duty processing reels, spools or bobbins.

let's get acquainted..

SEND FOR BULLETIN 52-W

MILTON MACHINE WORKS, Inc.
DESIGNERS — ENGINEERS — MANUFACTURERS
MILTON • PENNA.

AMERICAN CHEMICAL PAINT COMPANY
AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet
Subject: IMPROVED DRAWING AND COLD FORMING WITH GRANODRAW

INTRODUCTION:

When steel is phosphate coated with "Granodraw" prior to working it, drawing, extrusion, and other cold forming operations are greatly improved. In fact, the protective phosphate coating makes the cold extrusion of steel possible.

Getting cold steel to flow depends on the unique properties of this coating. Its non-metallic phosphate crystals are physically and chemically adapted to acquire a strongly adsorbed lubricant. The combination of adherent phosphate coating and adsorbed lubricating film possesses a low coefficient of friction while maintaining its integrity under extremely high deforming pressures.

The drawing of wire and many other cold forming operations — including the cold extrusion of steel — are greatly facilitated by the application of a "Granodraw" phosphate coating and a suitable lubricant prior to working.

"GRANODRAW" DATA

"Granodraw" zinc phosphate coating chemical is applied to pickled surfaces in an immersion or spray process. When used with a suitable lubricant, the coating reduces friction under conditions of low, medium, or high deforming forces encountered in such typical operations as: cold extrusion of steel; cold shaping; deep drawing (tubs, cartridge cases, shells, etc.); stamping; drawing of wire and tubing; ironing; necking; nosing; and upsetting.

ADVANTAGES OF PHOSPHATE COATING WITH "GRANODRAW" PRIOR TO COLD FORMING STEEL

The following are among the advantages indicated for phosphate coating with "Granodraw" prior to cold forming steel:

Drawing of wire, bars, tubing, etc. — Improved lubrication; improved surface; less scratching; reduced pull; greater percent reduction per pass; reduced die wear; longer die life; lower die maintenance and cost; reduction in corrosion.

Drawing of stampings, shells, shell cases, etc. — Improved lubrication; reduced breakage; reduction in scrap; deeper draws; less scratching; elimination of some annealing; less wear on dies.

Cold Extrusion — Improved lubrication; increased strength of parts; improved surface; reduction in load on press; greater dimensional accuracy; more uniform wall thickness; longer extrusions; elimination of some annealing; less corrosion.

CHEMICALS ACP PROCESSES WRITE FOR FURTHER INFORMATION ON "GRANODRAW" AND ON YOUR OWN METAL PROTECTION PROBLEMS. CHEMICALS ACP PROCESSES

New Million Dollar Metal Carbides Plant

The Metal Carbides Corporation, Youngstown, Ohio, is constructing a new 40,000-sq. ft. plant on a 25-acre site at 6001 Southern Blvd., Youngstown, Ohio. The new plant will be in operation in January, 1954, and will be used to produce tungsten carbide metal, including tool tips, die nibs, bar stock, rings, bushings and special shapes. Building is of steel, concrete and brick construction and is air-conditioned throughout. Machinery and equipment are laid out to achieve maximum efficiency and economy of process flow. Size and capacity of equipment will enable tungsten carbide metal to be mass produced on a scale not heretofore possible. In addition to tungsten carbide metal, tantalum carbide and titanium carbide will also be produced, as well as tungsten alloy heavy metal, cermets and high temperature alloys, all produced by powder metallurgy methods.

★ ★ ★

The above new facility will be operated in addition to the main plant at 107 E. Indianola Avenue, Youngstown, Ohio, which will continue in operation. Total manufacturing space of all plant facilities will be approximately 100,000 sq. ft. All operations from ore and oxides to finished products are performed at Metal Carbides, using the latest laboratory and quality control methods. Powder metallurgy methods, employing both the sintering process and hot-press method, are used to produce dies, tools, rolls and other parts up to diameters of 25", lengths up to 40" and up to 1,000 pounds weight per piece.

THE WIRE ASSOCIATION
invites wire men to join the organization and participate in its activities.

Write for a booklet on what it is and how it functions to

RICHARD E. BROWN
Executive Secretary
453 Main Street Stamford, Conn.

Outstanding Personalities of the Wire Industry

The Wire Association Clock Wound for 1954

The beautiful grandfather clock that graces The Association's headquarters, presented in 1948 by **John Rigby** on behalf of the British members of **The Wire Association,** was wound again for another year on November 23rd by **Charles D. Gill,** Chairman of Directors, **Spencer Wire Company Limited,** Wakefield, England.

★ ★ ★

Mr. Gill, who had been in America for two months and who attended our Annual Convention in Chicago, came to our office to perform this annual, and now traditional, ceremony, bringing with him the gracious Mrs. Gill, who had accompanied him in his travels about the country. Mr. Gill proved to be a most able, and one might say experienced clock winder, for he did a thorough job that is calculated to furnish adequate motive power to operate the clock for another four hundred days.

★ ★ ★

Charles D. Gill * * * * * *

The invitation to wind the clock was extended to Mr. Gill shortly after his arrival in this country, to which he generously responded in the affirmative. The ceremony was followed by a most enjoyable tea, during which Mr. Gill expressed his very warm appreciation of the many courtesies that had been extended to him by his American confreres, many of whose plants he had been able to visit.

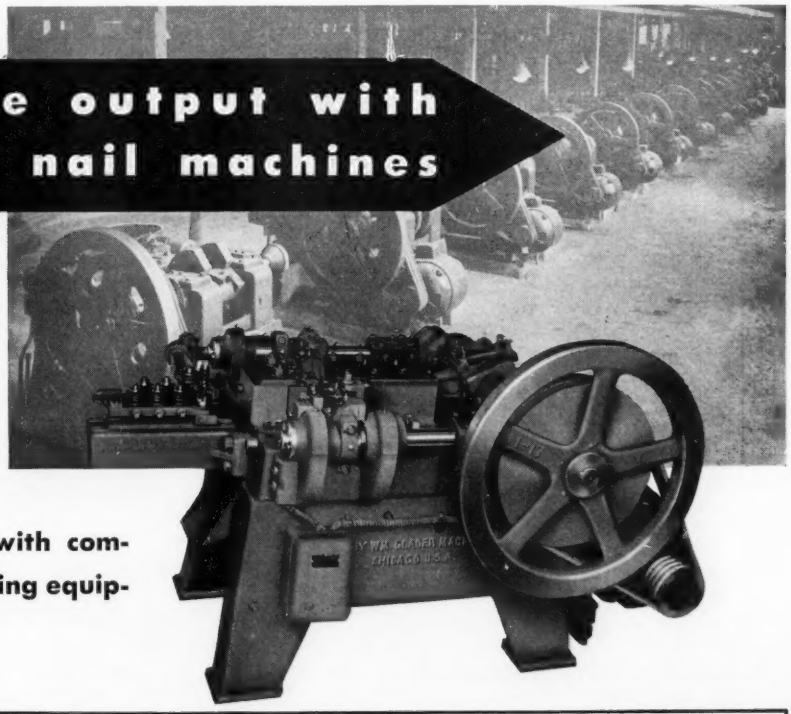
★ ★ ★

Mr. Gill's name is being inscribed on the parchment that hangs beside the clock, bearing the names of our English members who have wound the clock each year since 1948.

Celanese Adds Man for Midwest

Paul Conaway has joined the Plastics Division of **Celanese Corporation of America** as a sales re-

high tonnage output with GLADER wire nail machines



A size and type machine available to make everything from tacks and brads to 12" spikes with maximum efficiency.

Write for 12 page bulletin with complete information on nail making equipment.

WM. GLADER MACHINE WORKS 210 N. RACINE AVENUE CHICAGO 7, ILLINOIS

Export Dept.: 122 E. 42nd Street, New York 17, N. Y.

presentative in the Midwest District, with headquarters at 1514 Merchandise Mart, Chicago, Illinois. Mr. Conaway formerly was with Reynolds Metal Company.

Alloy Metal Wire Purchased by H. K. Porter Co.

H. K. Porter Company, Inc., has announced acquisition of **Alloy Metal Wire Company,** Prospect Park, Pa., according to **T. M. Evans,** president of Porter.

★ ★ ★

Alloy Metal Wire Company produces stainless and alloy steel wire, rod and strip for use principally in the electrical, electronic and chemical fields. Operations will continue as Alloy Metal Wire Company, division of H. K. Porter Company, Inc.

★ ★ ★

This acquisition, in line with Porter's continuing policy of diversification, places the company in the wire drawing field in addition to its present operations in rubber, steel, electrical equipment, forged steel fittings, hydraulic equipment, and wire rope.

★ ★ ★

"It is the Porter company's policy," stated Mr. Evans, "to expand and diversify its operations whenever a favorable opportunity presents itself, so that it will not be dependent on any one industry."

★ ★ ★

Porter divisions now include Quaker Rubber Corporation, Philadelphia; Connors Steel division, Birmingham; Buffalo Steel division, Tonawanda, N. Y.; Delta-Star Electric division, Chicago; Hinderliter Tool Company division, Tulsa; Leschen Wire Rope division, St. Louis, and Watson-Stillman Company, Roselle, N. J.

Firth Sterling Elects Two VPs

Firth Sterling Inc. has announced the election of **T. G. Barnes** as Vice President-Sales, and **J. T. O'Brien** as Vice President-Operations.

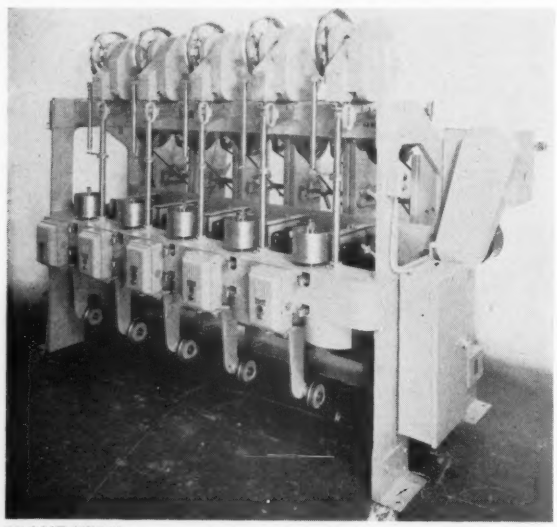
★ ★ ★

Upon graduation from Virginia Polytechnic Institute, Mr. Barnes entered the employ of Jones & Laughlin Steel Corporation and soon thereafter entered the Armed Services from which he was released with the rank of Lieutenant Colonel in 1945. After four years with Reynolds Metals Company he joined Firth Sterling as Production Manager, and at the time of his election to his present post, he was General Manager of Sales.

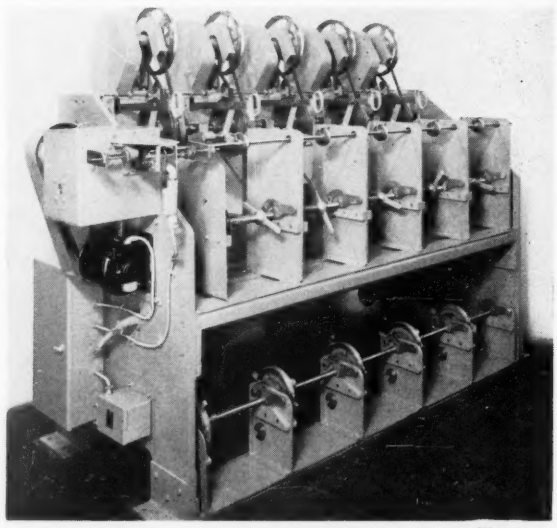
★ ★ ★

Mr. O'Brien was for many years with the United States Steel Corp. and resigned as Assistant General Superintendent in Charge of Production at McDonald Mills Division to join Firth Sterling as Works Manager of the Steel Division in 1949. In 1951 he was placed in charge of all company operations with the title of Works Manager until his election to his present position.

Cheerfulness lubricates the axles of the world-great numbers of people go through life with a continuous squeak.



FRONT VIEW



REAR

#2S-5-MBB INSULATION WINDING MACHINE

APPLIES SINGLE COVER TO 5 LINES OF WIRE SIMULTANEOUSLY. NOMINAL WIRE RANGE #15 TO #25 B & S GAUGES (.057" TO .018" OR 1.450 TO .455MM). STANDARD CAPSTANS 8" DIAMETER, BUT MACHINE ILLUSTRATED IS SPECIALLY ARRANGED WITH 12" DIAMETER CAPSTANS, IN PLACE OF STANDARD 8", FOR HEAVIER WIRES. SUPPLY WIRE LET-OFFS AND TAKE-UPS ARE AT REAR OF MACHINE.

EST. 1855 AIMCO INC. 1915

"American" AIM INSULATING MACHINERY COMPANY

REG. U.S. PAT. OFF.

FAIRHILL AND HUNTINGDON STREETS

PHILADELPHIA 33 PENNSYLVANIA U.S.A.

Stainless Steel Pioneer Retires

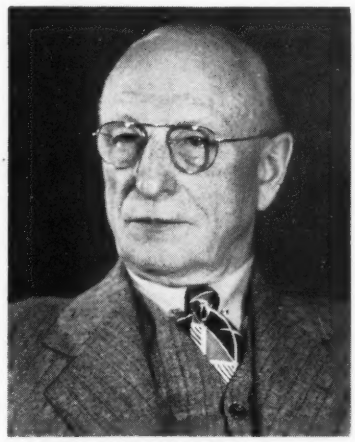
L. Gerald Firth, the man who introduced stainless steel to America, and internationally known pioneer and authority on specialty steels and sintered carbides, has retired, effective October 1, as vice president and director of research for **Firth Sterling Inc.,** Pittsburgh, Pa., after 39 years of service with the company.

★ ★ ★

Mr. Firth witnessed the first pouring of a stainless steel ingot at Thomas Firth & Sons in Sheffield, England in 1913, and brought the formula and process of Harry Brearly's invention to Firth Sterling in McKeesport, Pa., early the following year. Mr. Firth's theory, which was tested and proved correct, was that by sufficiently lowering the carbon content of the metal, a grade of stainless steel could be obtained which would be stainless without hardening. This was the genesis of the well-known "stainless iron," now known as type 410.

★ ★ ★

Mr. Firth's research activities were interrupted when he entered the British Army at the outbreak of World War I in August 1914. When he returned to Firth Sterling in 1918, he resumed his work and as a result, Firth Sterling became pioneers of stainless steel and iron in the cutlery trade and other fields. He also served as a director of the American Stainless Steel Co. until the expiration of the Brearly Patent in 1933.



L. Gerald Firth

★ ★ ★

He made many contributions to the tool and die steel industry and was directly responsible for the development of universally used Circle C High Speed Steel. During the same period, Mr. Firth was instrumental in the development of Cromovan, a well-known and widely used die steel. In 1928 under the guidance of Mr. Firth, Firth Sterling began experimental work on sintered carbides and was the first tool steel company to manufacture and market tungsten-carbide tools and dies. Each of these developments has special significance to the metalworking and woodworking industries.

★ ★ ★

Born in England in 1886, Mr. Firth attended Uppingham School and Cambridge University. In

Here is the difference between just any reel and MPS reels with
DURA CURL RIMS
Yes, it's the exclusive MPS heavy duty thickened-section rims that assure maximum strength and rigidity throughout the reel heads. Flange run-out and straightening expenses are eliminated by this patented MPS development. DURA-CURL rims are now standard on all MPS wire drawing, annealing, and stranding spools and reels. We invite your inquiries — let us tell you more about Dura-Curl rims.
MPS
trouble-free winding spools and reels
Mossberg PRESSED STEEL Corporation
18 WEST STREET • ATTLEBORO • MASSACHUSETTS, U. S. A. TEL ATTLEBORO 1-0848
JAMES DAY (MACHINERY) LTD. 28 MADDOX STREET, LONDON W. 1, ENGLAND
107

1910 he joined Thos. Firth & Sons in Sheffield, England, where he was employed in their Tinsley Tool Steel Plant. In 1918 he permanently settled in Pittsburgh, and became works manager of Firth Sterling. From 1933 to 1947 Mr. Firth served as president and general manager of the company.

Hubbard Adds to Sales Staff

Hubbard Spool Company, Garrett, Indiana, has announced the appointment of **John C. Kerr** as sales engineer to serve that portion, of the midwest territory embraced in the states of Indiana, Ohio, Michigan and Pennsylvania.

★ ★ ★

Mr. Kerr, whose home is in South Haven, Michigan, brings to the company a certain knowledge of the wire industry as in his previous work with General Fibres Corporation, he spent much time in developing a new type of shipping container for wire.

★ ★ ★

He is much interested in the development of new spools and reels and will be helpful to the company in their accelerated program of designing and producing the new shipping and process reels required by the rapidly expanding wire and cable industry.

Appoints Fenn as American Agents

Marshall Richards Machine Co., Ltd., Crook, England, has concluded arrangements with The Fenn Manufacturing Company, Hartford 1, Conn., to represent them on an exclusive basis in the United States and Canada. The agreement also covers the possibility of the manufacture of Marshall Richards wire machinery and parts by Fenn under a license.

★ ★ ★

Through the arrangement, Marshall Richards hopes to give the wire industry here better sales coverage and provide their customers with a readily available parts service, overcoming some of the difficulties with which they previously contended due to the distance involved.

Appointed Assistant Manager Of Townsend Unit

Townsend Company, New Brighton, Pa., manufacturer of rivets, industrial fasteners and cold headed parts, has announced appointment of **W. R. Wyckoff** to the new position of assistant manager, Midwest sales division, in Chicago.

★ ★ ★

Mr. Wyckoff, who will assume his new duties January 1, 1954, will be succeeded as sales representative in the Peoria, Ill., area by **Donald L. Byrne,** of Baden, Pa.

★ ★ ★

Howard E. Chilcoat, general sales manager of the Townsend Company, said the new position was created because of continuing expansion in the Midwest division.

★ ★ ★

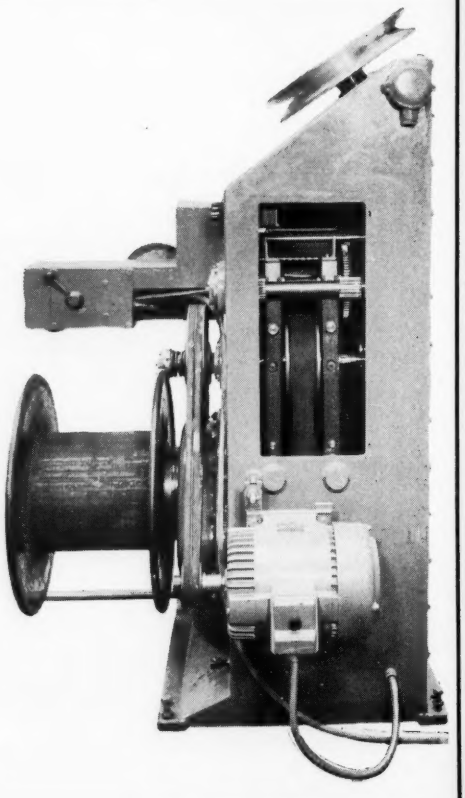
Mr. Wyckoff has been with Townsend since August 1, 1949, and came to the Midwest sales division as a salesman in September of 1950. He is a graduate of the University of Michigan.

POURTIER SHOWS TO U.S.

his Take-up for Tinned Wires

- Instead of receiving in coils the tinned wire, you will save one rewinding operation by using our patented device. You will receive directly on drums up to 30", wires from 8 to 22 Awg.
- Constant linear speed: no capstan, no contact on the drum. The regulation is obtained by 90° around a pulley. This pulley acts on an automatic speed-changer at each new spiral of wire. This pulley is itself driven through a regulated friction and irreversible gears. No excessive tension, even on the fine wires.

Speed regulated from 60 to 200 yards/minute. Discharge of full drum by pneumatic jacks. Traverse adjustable in speed and width, positively linked to the rotation of the drum. Dimensions: 3' x 3' x 4' Weight: 600 lbs. Supplied with 3 HP motor, electric equipment and counter.



POURTIER MACHINES

153, rue Gallieni, ROMAINVILLE (Seine) FRANCE

Clarence Arms Retires from Thompson Wire—To Work As Consultant

After forty-eight years in the wire business, **Clarence S. Arms,** retired as manager of **Thompson Wire Company's** wire mill in Worcester, Mass., on December 31, 1953.

★ ★ ★

Mr. Arms is a graduate of Union College, 1905, from which institution he holds a degree in Civil Engineering. In the years in which he got his parchment he joined **John A. Roebling's Sons Company** as Resident Engineer in charge of the construction of an industrial village and a new steel mill at Roebling, New Jersey. In 1910 he was made Assistant Superintendent of their Open Hearth and Rolling Mill departments.

★ ★ ★

After five years at Roebling, he moved to Palmer, Massachusetts, to accept an invitation to serve as Manager of the Palmer plant of the **Wright Wire Company,** which later became a part of the **Wickwire Spencer Steel Company.**

★ ★ ★

Mr. Arms joined the staff of **Sleeper and Hartley, Inc.,** in 1925 as Designing Engineer of wire mill equipment, a type of work for which he had considerable talent, but got back into production work again in 1927, when the **Thompson Wire Company** started to build a new mill in Worcester. He was appointed Manager of this new mill, a position he occupied to the time of his retirement.

★ ★ ★

Mr. Arms will work again with Sleeper and Hartley in the capacity of a consulting engineer having offices at their place of business at 335 Chandler St., Worcester, Mass. His services as a Consulting Wire Mill Engineer, specializing in wire mill machinery, plant layout and production techniques are extended to our industry.

★ ★ ★

He is well known throughout the industry, and his long and rich experience in steel wire manufacture equips him admirably for rendering competent assistance to others as a consultant.

Crucible Steel Promotes Two

Crucible Steel Co. of America, Pittsburgh, appointed **David I. Dilworth Jr.** director of metallurgy to succeed **Lorin L. Ferrall,** who has been made assistant vice president and assigned to the operating department of the company.

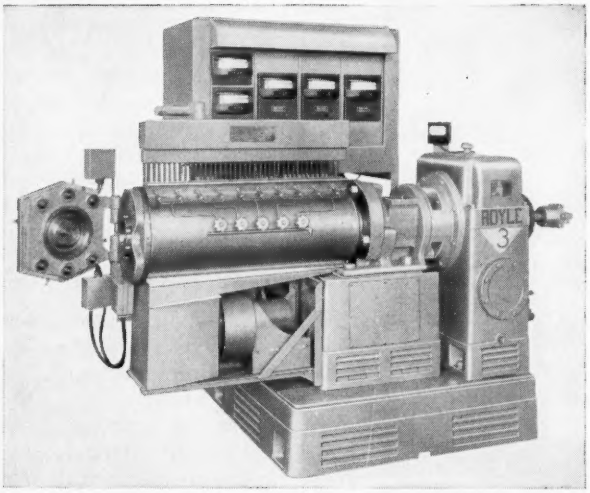
Edwin F. Brown

Edwin F. Brown, 72, retired executive of U. S. Steel Corp.'s **American Steel & Wire Division,** Cleveland, died Dec. 19 in Orlando, Florida.

★ ★ ★

For a number of years before his retirement in 1946, Mr. Brown was general superintendent of the American, the Consolidated and the Newburgh wire works for the division.

FASTEST HEATING FASTEST COOLING



Here are some of the time-tested, money-saving reasons more and more plants are standardizing with Royle Spirod* Extruders for processes requiring maximum flexibility in controlled temperatures — constantly maintained and accurately zoned:

- **Extra heavy walled cast steel cylinders that will not warp. No joints to leak when pressures are high or crevices to collect burned compound that would cause contamination.**
- **Heavy duty large diameter heating elements, that can be used with 440 volts without step-down transformers, provide radiant heat to cylinders and heads.**
- **Any heating element may be removed and replaced without disturbing other elements or wiring.**
- **A cooling system with ten times the capacity of conventional designs can be modulated through its entire temperature range without drastic changes. Ample cooling for all compounds at maximum speeds.**

No. 3 Royle Spirod Extruder. Completely insulated and equipped for evaporative cooling.

*Patent Applied For

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PIONEERED THE CONTINUOUS EXTRUSION PROCESS IN

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PATERSON 3, NEW JERSEY

Ajax Executive Lecturing in Europe

L. B. Rosseau, Vice President in Charge of Sales, **Ajax Electric Company,** is in Europe delivering a series of lectures in England, Scotland, and France to metallurgical and engineering groups on modern salt bath heat treating methods as practiced in the United States.

★ ★ ★

Mr. Rosseau will emphasize the techniques utilized for such heat treating operations as martempering and austempering to control distortion and warpage in hardening gears, shafts and similar critical steel products. The use of salt baths for brazing steel and aluminum assemblies, while widespread in the United States, is also lagging in Europe. In addition, the very latest application for salt baths, namely, aluminizing steel products to develop corrosion and heat resisting properties, will be explained.

★ ★ ★

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AS&W Appointments for New Haven, Trenton & Worcester

Two executives were promoted to top operating posts in the New Haven and Trenton Works of the **American Steel & Wire Division,** it was announced by **George A. Gleason,** manager of operations for the division of the **United States Steel Corporation.**

★ ★ ★

Edwin E. Caspell, who has been works superintendent at the New Haven plant, is appointed general superintendent of the New Haven, Conn., and Trenton, N. J. plants. Succeeding Mr. Caspell as superintendent of New Haven Works is **John J. Grimes, Jr.,** who has been superintendent of the wire rope department at the Trenton plant.

★ ★ ★

Mr. Caspell succeeds **Stephen B. Metcalfe,** recently appointed assistant district manager of operations of the Worcester District. He began his career with the Wire Division as a wire drawer learner at Newburgh Works, Cleveland, in 1927 while attending the University of Cleveland on a cooperative work schedule for four years. After obtaining his degree he was assigned as a technical apprentice at New Haven Works and received intensive training in several divisions of the wire rope department at that plant, becoming general foreman in 1938, and superintendent of the wire rope department five years later. In 1945, he was promoted to works superintendent at the New Haven plant, a post he has held until now.

★ ★ ★

Mr. Grimes' first position with the Wire Division was that of observer in the metallurgical department at Cuyahoga Works, Cleveland, where he started work in 1936. He moved through several posts in the metallurgical department before entering military service in 1942. He ended his service as a major in Air Force Material Procurement in 1946, and again resumed his work at the Cuyahoga plant.

★ ★ ★

In June, 1946, he was transferred to the Trenton Works as a metallurgist, and six months later was promoted to general foreman of the wire rope department, becoming superintendent of that department in 1952, a post he has held until the present promotion.

★ ★ ★

Mr. Metcalfe joined the Wire Division in 1929 and received intensive training in several divisions of the wire drawing and wire rope making departments at New Haven Works before being appointed a foreman in the wire rope department of that plant. In 1934, he was promoted to division superintendent of the rope mill at New Haven Works and in 1938, he was made superintendent of Trenton Works. In January, 1942, he was appointed general superintendent in charge of both the New Haven and Trenton mills. In November, 1945, he was transferred to Cleveland headquarters on a special engineering assignment and returned to his post as general superintendent of the New Haven and Trenton Works in 1948, and has held that post until his present promotion.

C. A. Litzler Announces Formation of Firm of Technical Consultants and Equipment Designers

Formation of **C. A. Litzler Co., Inc.,** consulting engineers and designers of equipment and systems for the continuous processing of webs and monofilaments, has been announced by **C. A. Litzler,** President of the new firm. Offices of the company are located at 11621 Detroit Avenue, Cleveland 2, Ohio.

★ ★ ★

The new organization is specializing in the design, manufacturing supervision and erection of tire cord machinery, calender train units and similar continuous processing and materials handling systems.

★ ★ ★

Mr. Litzler resigned earlier this year as president of **Industrial Ovens, Inc.,** a firm he founded twelve years ago, and is now devoting full time to his new firm.

To Manage Nopco's Canadian Plant

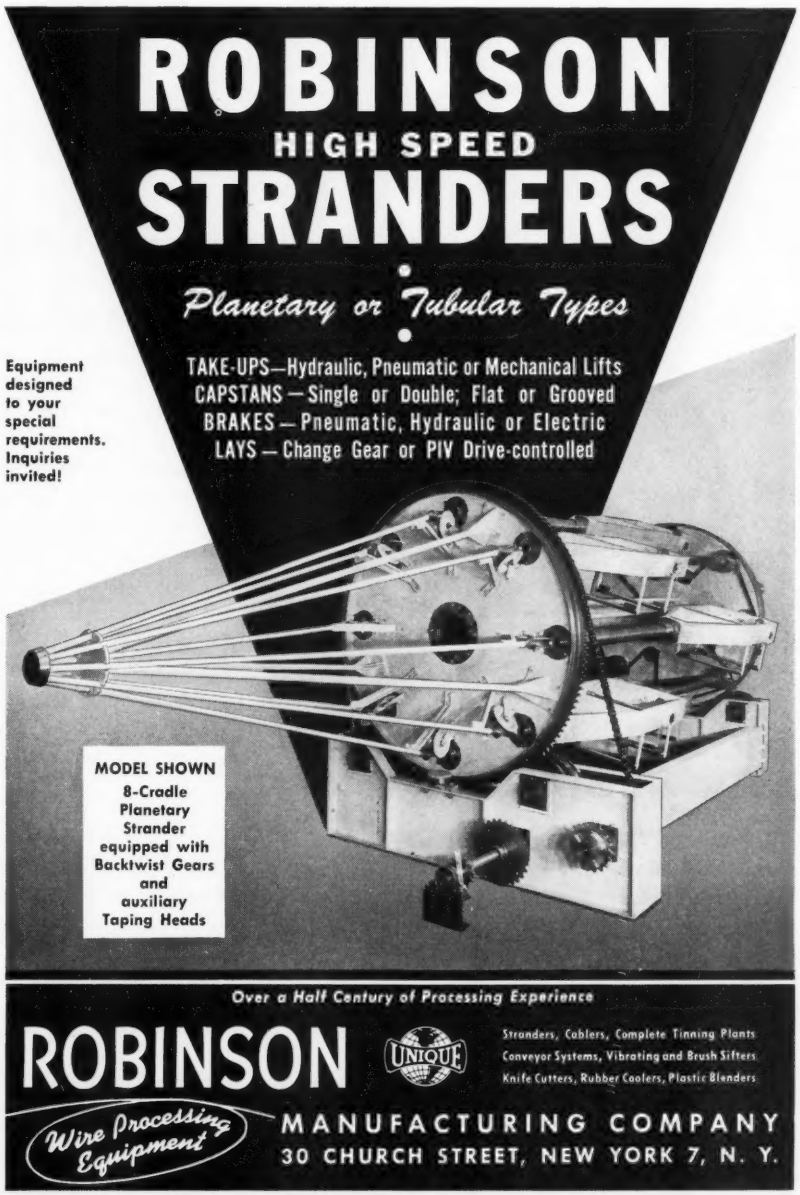
Thomas A. Printon, President of **Nopco Chemical Company,** Harrison, New Jersey, chemical manufacturer has just announced the appointment of **Robert F. McClellan** as Vice-President and General Manager of **Yocum Faust, Ltd.,** London, Ont., Nopco subsidiary and major Canadian producer of industrial processing chemicals.

★ ★ ★

Mr. McClellan, since 1942, has been mid-west district manager of Nopco, with headquarters in Chicago. He brings to his new task a thorough knowledge of the production and marketing of the type of products manufactured by Yocum Faust. His career at Nopco extends over 25 years.

★ ★ ★

One of the new General Manager's first duties will be supervising the considerable additions to the Canadian plant, plans for which are now under way.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Abrasives Sales Supervisor Named by Elgin Watch Company

Thomas A. Johnson, a division field engineer in northern Ohio since 1952, has been appointed supervisor of sales for the abrasives division of Elgin National Watch Company, Elgin, Ill., it has been announced by **C. R. Myer,** division manager.

★ ★ ★

Mr. Johnson, who was graduated in 1948 from Northwestern University with a degree in mechanical engineering, will supervise the abrasive division's field-selling force from the company's headquarters at Elgin.

★ ★ ★

The division processes and markets diamond compound used by industry for finishing and polishing high-accuracy tools and dies, particularly those made of tungsten carbide.

Glass Fibers Appoints New York Eastern Representative

Richard H. Garnett has been appointed a textile sales engineer with **Glass Fibers Inc.,** and assigned to the company's New York office in the Chrysler East Bldg., according to a joint announcement by **R. W. Capaul,** vice president and general sales manager and **R. V. McCallister,** New York Branch Manager of the glass concern.

★ ★ ★

In his new assignment, Mr. Garnett will contact and service Glass Fibers' textile accounts in the Eastern area. These include broad and narrow fabric weavers, paper processors, wire and cable manufacturers.

★ ★ ★

Previous to coming with Glass Fibers Inc., Mr. Garnett had been new products sales engineer for the United States Rubber Company and had served in sales and administrative capacities with Burlington Mills Corporation, New York City, and The A. D. Juilliard Company at Olneyville, Rhode Island.

New Address for ACP Detroit Office

American Chemical Paint Company's Detroit Office has moved to 10225 West McNichols Road, Detroit 21, Michigan. **D. L. Miles,** Manager of the Mid-West Territory, is supported by a staff of technical sales-service representatives consisting of J. B. Rohrer, J. J. Linden, O. E. Crisler and other field representatives.

★ ★ ★

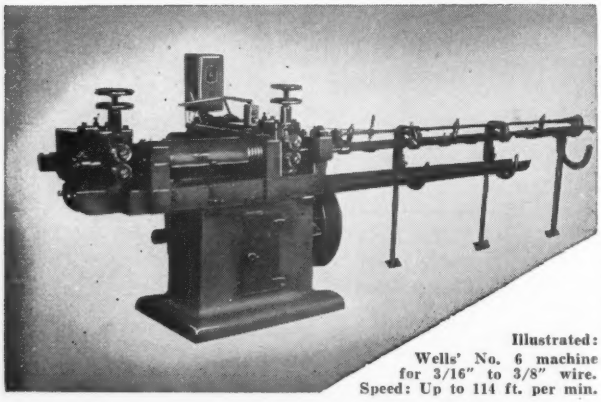
As in the past, warehouse stocks of ACP's complete line of rust-proofing chemicals, phosphate coating chemicals, and metal cleaners, rust removers, and pickling acid inhibitors are maintained for emergency purposes.

(*Please turn to page* 93)

What do you want in your

STRAIGHTENER and CUTTER?

- **DEPENDABILITY?** **WELLS machines provide day-in, day-out continuous operating service.**
- **SPEED?** **These automatic rotary machines will not only give you speed, but accuracy as well.**



Illustrated: Wells' No. 6 machine for 3/16" to 3/8" wire. Speed: Up to 114 ft. per min.

Cuts wire in any length from 7½" up to 25'. Special attachment furnished on order for long lengths. Straightener flier runs in ball bearings. Gear drive and motor enclosed in base. Door provides accessibility.

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A Review of Recent Wire Patents

No. 2,657,402, SCREW SHANK SLOTTER, patented November 3, 1953 by Ougljesa Jules Poupitch, Chicago, Ill., assignor to Illinois Tool Works, Chicago, Ill., a corporation of Illinois.

There are eleven claims to this slotter in which a row of screws are moved successively into engagement with the slotting device.

★ ★ ★

No. 2,657,403, BLANK FORMING APPARATUS, patented November 3, 1953 by Carleton W. Eade, Milldale, Conn., and William W. Schug, Hudson, N. Y.; said Eade assignor, by mesne assignments, to The Dalemill Company, Waterbury, Conn., a corporation of Connecticut, and said Schug assignor, by mesne assignments, to Emhart Manufacturing Company, Hartford, Conn., a corporation of Delaware.

The apparatus is for making four-sided nuts from cylindrical slugs.

★ ★ ★

No. 2,657,740, SPRING SEAT STRUCTURE, patented November 3, 1953 by Howard G. Daniels, Dearborn, and Edwin C. Pickard, Detroit, Mich., assignors to Ford Motor Company, Dearborn, Mich., a corporation of Delaware.

Invention is said to reside in the provision of a special form of sinuously corrugated wire springs with auxiliary tension wire members removably attached to the under sides of the springs.

★ ★ ★

No. 2,657,788, WOVEN WIRE CONVEYER BELT, patented November 3, 1953 by Donald G. Merrill, West Hartford, Conn., assignor to Embart Manufacturing Company, a corporation of Delaware.

Turns of two adjacent spirally formed wires and portions of a hinge wire extending therethrough are cooperatively shaped and associated to cause a pull on all turns of the relatively trailing one of two hingedly connected wires when the belt is being pulled in a forward direction along a horizontal supporting guideway and to permit limited relative axial shifting movements between these two hingedly connected wires when they pass from a straightaway portion to a laterally curved portion of a guideway and vice versa while all turns of the trailing wire are under pull from the leading one.

★ ★ ★

No. 2,658,014, METHOD OF MAKING ELECTRICAL CABLE, patented November, 3, 1953 by James J. Morrison, Worcester, Mass., assignor to United States Steel Corporation, a corporation of New Jersey.

The method includes assembling a number of insulated wire conductors so as to have valleys between them, there is extended an inner jacket and filler of a vulcanizable elastomer completely around and into contact with the assembled conductors, such elastomer containing a sufficient quantity of a blowing agent to cause the elastomer to expand in volume from 25 to 100% when vulcanized in place around the cable and in contact with an extruded outer jacket forming body around the inner jacket and filler, the outer jacket forming body being composed of a vulcanizable elastomer of such composition that when vulcanized it forms a dense, tough material.

★ ★ ★

No. 2,658,116, TELEPHONE HANDSET HOLDER, patented November 3, 1953 by Vincent J. Skantze, Detroit, Mich.

The holder is constructed of a single length of wire and is adapted for use with French type telephone stands.

★ ★ ★

No. 2,658,263, METHOD OF WINDING AND PACKAGING COILS, patented November 10, 1953 by Benjamin B. Scott, Jr., Schenectady, N. Y.

In this patent the method is directed to packaging the wire within a can.

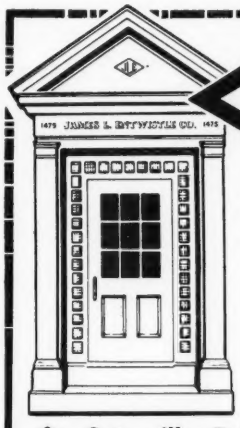
★ ★ ★

No. 2,658,267, SPRING WINDING MACHINE, patented November 10, 1953 by Peter J. Bianco, Detroit, Mich., assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware.

Fourteen claims are in the patent to a wire spiral spring winding machine.

★ ★ ★

No. 2,658,536, BLOSSOM STEMMING MACHINE, patented November 10, 1953



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See Page 30 for News of JLE Heavy-Duty Enamel Wire Take-Up

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by Charles M. Andersen, Los Angeles, Calif., assignor to Floyd R. Honn, Los Angeles, Calif.

More specifically, this patent is to a machine for forming wire stems on flowers.

★ ★ ★

No. 2,658,611, WIRE DRAWING BLOCK AND STRIPPER ASSEMBLY, patented November 10, 1953 by Edwin J. McIlvried, Stow, Ohio, assignor to The Vaughn Machinery Company, Cuyahoga Falls, Ohio, a corporation of Ohio.

The assembly includes an annular apron closely encircling the block and mounted for rotation about an axis at a slight angle to the block, and a resilient flexible interconnection between the block and apron for rotation of the apron with block.

★ ★ ★

No. 2,659,408, WIRE BENDING DIE UNIT, patented November 17, 1953 by Edwin O. Klemm, Saginaw, Mich., assignor by mesne assignments, to Saginaw Wire Products, Inc., Saginaw, Mich., a corporation of Michigan.

Included are relatively flat cam dies swivelly mounted on the end of slides and in horizontal alignment therewith to cooperate with stationary dies in progressively bending wire to the desired shape, each cam die having a pair of forwardly extending curved fingers of pre-determined length and curvature, each stationary die being positioned adjacent a cam die in a position where, when the cam die moves forwardly, one of the fingers will form the wire to the shape of the rear wall of the stationary die and guide thereon, while the second finger progressively completes the bending by forming the wire to the side wall of the stationary die.

★ ★ ★

No. 2,659,409, WIRE BENDING MACHINE, patented November 17, 1953 by Edwin O. Klemm, Saginaw, Mich., assignor, by mesne assignments, to Saginaw Wire Products, Inc., Saginaw, Mich., a corporation of Michigan.

The machine includes die bar slides reciprocably mounted in a bed plate, the slides each having single slots of varied length with relation to one another extending in the direction of travel of the bar slides, forming dies on a frame spaced from the ends of the slides and in alignment therewith.

★ ★ ★

No. 2,659,420, BACK REST, patented November 17, 1953 by Charles Edward Burke, Norfolk, Va.

This includes a box-shaped frame constructed largely of wire with wire supports and provides an air-cooled support for the back.

★ ★ ★

No. 2,659,952, FASTENING DEVICE, patented November 24, 1953 by Ernest Schlueter, Hollis, N. Y., assignor, by mesne assignments, to Simmons Fastener Corporation, Albany, N. Y., a corporation of New York.

A stud element is disclosed, adapted to be secured in a hole in a work structure having adjacent to the hole opposite engagement portions having exposed engagement faces.

★ ★ ★

No. 2,660,084, FASTENING MEANS, patented November 24, 1953 by Leopold Newman, New York, N. Y., assignor to Falcon Fasteners, Inc., New York, N. Y., a corporation of New York.

A nail type fastener is disclosed, including a sleeve about the shank which is deformed and spread by hammering upon the head of the nail.

★ ★ ★

No. 2,660,227, SPRING CONSTRUCTION, patented November 24, 1953 by Floyd S. Laurie, Royal Oak, Mich., assignor to American Metal Products Company Detroit, Mich., a corporation of Michigan.

The construction embodies a sinuous wire spring strip.

★ ★ ★

No. 2,660,328, COLLAPSIBLE STACKING RECEPTACLE, patented November 24, 1953 by Charles C. Averill, Albion, Mich., assignor to Union Steel Products Company, a corporation of Michigan.

More specifically this is a basket with handles and supports adjacent the corners and all constructed of wire.

★ ★ ★

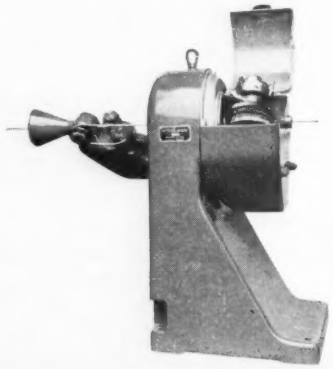
No. 2,660,406, BARBED WIRE STRUCTURE, patented November 24, 1953 by Alan E. Brickman, Worcester, Mass., assignor to United States Steel

LINÉ-GORCY

MECHANICAL

WIRE ROD DESCALERS

(Patented in U.S.A.)



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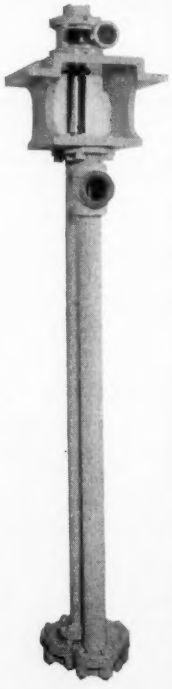


Corporation, a corporation of New Jersey.

A welded wire fabric is claimed having one flat side comprising a number of cross wires welded on top of a number of longitudinal wires to form a unitary mat, some of these longitudinal wires being cut on a bias and bent outwardly from the plane of the fabric to form barbs all of the barbs extending outwardly in one direction from the fabric on the side opposite the longitudinal wires.

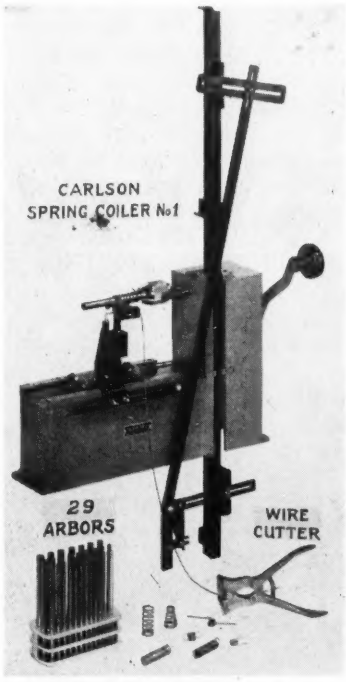
★ ★ ★

New Hand-Operated Spring Coiler

This new hand-operated spring coiling machine is especially useful in tool rooms and small machine shops for making prototypes and small production runs up to 1000 compression, extension and torsion springs. It has been redesigned and uses aluminum castings and a ball bearing carriage to increase accuracy and simplify operation.

★ ★ ★

Inexperienced operators with this machine can easily coil compression springs to any desired pitch with the coils at both ends squared automatically. Extension springs can be wound with or without initial tension and torsion springs can be wound either left or right hand with long extended arms on both ends.



New Spring Coiler

★ ★ ★

250 to 400 compression or 200 to 300 extension or torsion springs can be coiled per hour, and all will be exactly alike. Wire diameters can vary from .004 to .065 in. and spring diameters from 1/32 to 1¼ in. with lengths up to 4½ in. Arbors, wire cutters and extra coiling points are included. Shipping Weight 50 lbs. Descriptive bulletin available from **THE CARLSON COMPANY,** 277 Broadway, New York 7, N. Y. or phone BArclay 7-2552.

Plans Coaxial Cable Plant

Andrew Antenna Corp. Ltd., a newly formed subsidiary of Andrew Corp., 363 E. 75th St., Chicago, will build a branch coaxial cable manufacturing plant in Toronto, Ont. The factory is expected to go into production early next year, according to J. W. McLeod, who will manage the Canadian plant.

WAFIOS

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Wire Netting Machines for Chain Link, Hexagonal Mesh, Poultry Netting, Field Fence. Crimping, Barb Wire and Staple Machines. Spring Coilers. Spring End Grinding Automatics. Loop Benders. Upholstery Spring and Wire Mattress Machines. Wire Nail Machinery. Chain Formers. Chain Welders. Straightening and Cutting Machines. Multi-Slide Wire and Strip Forming Machines. Special Machinery for the making of Paper Clips, Lock Washers, Bale Ties, Key Rings, Tin Openers, Wire Bag Ties, etc. Automatics for Flexible Metallic Tubing.

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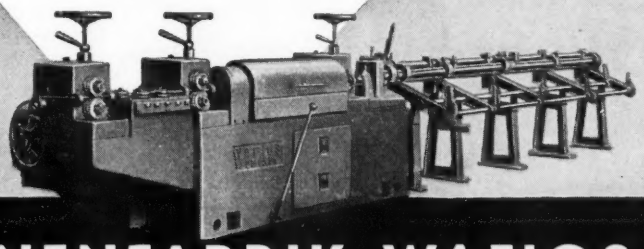

MASCHINENFABRIK WAFIOS

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Fidelity Knit-Covering Process Government Approved

According to a recent announcement made by the **Fidelity Machine Company, Inc.** of Philadelphia, weather-resistant cable and wire, covered on Fidelity Sinfra Knitters, has been approved by Federal Specification J-C-145, Amendment No. 1.

★ ★ ★

Sinfra Knit products are also approved by Underwriters' Laboratories, Inc., American Standards Association, Association of American Railroads, and Canadian Standards Association.

★ ★ ★

The Fidelity Sinfra Knitter is a new machine designed by the Fidelity Machine Company for covering weatherproof wire and cable, non-metallic sheathed cable, building wire, and other products using natural and synthetic yarns. Replacing old-fashioned braiders, Sinfra Knitters are now being used by most of the country's leading wire manufacturers.

★ ★ ★

Manufacturer reports that the machine covers wire at a speed of up to 25,000 feet per hour.

Beryllium Corporation Testing New Alloys

For the first time **The Beryllium Corporation, Reading, Pa.,** one of the world's foremost producers of beryllium and beryllium products, is manufacturing alloys that contain no beryllium.

★ ★ ★

The alloys are zirconium magnesium, manganese aluminum, and titanium manganese aluminum, and they are being produced strictly on a trial or market-testing basis to see whether the demand for any or all of these materials is enough to warrant going into production on a commercial scale.

★ ★ ★

Zirconium magnesium is presented as an oxygen-free hardening material. The alloy has a zirconium content of 30 to 40 per cent. Designed for use in producing magnesium alloy castings, it alloys readily and offers high efficiency of zirconium recovery in the final alloy.

★ ★ ★

Maganese aluminum, consisting of equal parts of each, is offered principally as a manganese additive to titanium alloys. It also has possibilities in the aluminum alloy field.

★ ★ ★

The third product—titanium manganese aluminum—is also designed to test demands from the growing titanium industry. Consisting of 30 per cent manganese, 30 per cent aluminum, and the rest titanium, it is aimed at introducing combinations of these metals in proportions designed to bring out useful and possibly new properties.

★ ★ ★

The production of these non-beryllium alloys on a commercial scale would not involve major overhauling of present methods and facilities.

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Firth Sterling Organizing South American Affiliate

Firth Sterling Inc. of Pittsburgh, Pa., and Brazilian Industrialist, **Prof. Dr. Ary Torres,** completed arrangements recently looking forward to the immediate formation of a Brazilian company in Sao Paulo which is designed to become the counterpart of Firth Sterling in Brazil. Firth Sterling currently purchases from Brazil substantial quantities of raw materials, chiefly concentrates of tungsten ore. On the other hand, in the present stage of Brazil's economic and industrial development, high speed tool steels and tungsten carbide cutting tools are not available from local resources. Operations of the new company commenced shortly after January 1, 1954, and in the early stages, the new company will import into Brazil the products of Firth Sterling. These importations will be more than offset by Firth Sterling's purchases in Brazil so that a highly favorable balance of trade will accrue to Brazil.

★ ★ ★

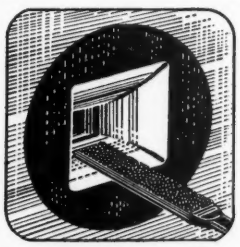
Plans are under way for the construction of a plant to produce sintered tungsten carbides in Brazil utilizing local raw materials. The plant will be designed and operations supervised in the early stages by Firth Sterling technicians. The long range program will result in further development of Brazil's natural resources by utilizing the techniques, know-how and manufacturing methods of the American company.

★ ★ ★

Prof. Dr. Ary Torres was until recently President of the Brazilian Bank of Economic Development, and of the Brazil-United States Joint Commission for Economic Development. He was formerly President of the Institute of Technological Research in Sao Paulo and now is Director of the Brazilian company which distributes heavy equipment for the Westinghouse Electric Corporation. He was a member of the original group that conceived and constructed the Volta Redonda Steel Plant and was formerly a Vice President of that company. Dr. Torres will bring to the new company a vast knowledge of Brazilian economic and industrial problems. **Kenneth D. Mann,** President of Firth Sterling, in making the announcement said, "Firth Sterling is proud to be associated with Prof. Dr. Ary Torres in this enterprise and is pleased to be in position to make this tangible expression of good will toward our Good Neighbor to the South."

Plans Expansion Of Plant

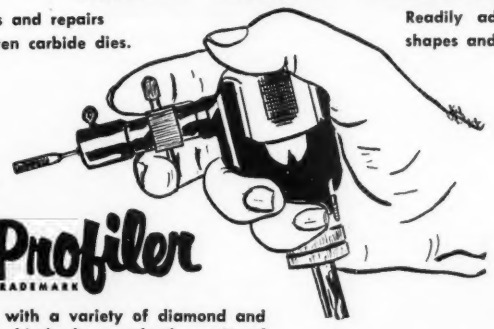
The Bergen Wire Rope Company, Gregg St., Lodi, N. J., has completed plans for the expansion of its facilities to produce wire rope. This program includes the erection of new buildings, the purchase of additional equipment and the setting up of new processing methods. Construction of the new buildings is expected to be started shortly. Henry C. Parker is president of the concern.



50 TIMES FASTER
THAN HAND FILING

Makes and repairs tungsten carbide dies.

Readily adapts to special shapes and contours.



SHARPENS
GRINDS
FILES
SCRAPES
HONES
LAPS
SAWS
STONES
CUTS
FINISHES
POLISHES

the ***Di-Profiler** TRADEMARK

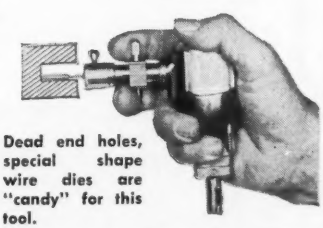
is furnished with a variety of diamond and needle files, chisels, burs and other units of many intricate shapes, thereby reducing the tool and die maker's problem of special tools (made on your time) by 90%.

The *Di-Profiler can be used for repairing dies, even without removing from machine. You can hold your files absolutely level for straight holes and provide an oscillating motion for contour. The reciprocating action does the work at a stroke ranging from 0" to ¼", without vibration because of the high precision of the tool. Once you see it—you'll never do without the *Di-Profiler. Write for full details and ask for a demonstration.

SAVE YOUR TOOL MAKER AND MAINTENANCE MEN BY PROVIDING TOOLS TO DO THE HARD, TIRING PART OF THEIR WORK.

*DI-PROFILER ELIMINATES THE HARD "ELBOW GREASE" WORK.

Everything comes in an attractive mahogany finished box — except the flexible shaft, rotary attachment and motor.



Dead end holes, special shape wire dies are "candy" for this tool.

Nord International Corp.

449-W CENTRAL AVENUE, ORANGE, NEW JERSEY

* An exclusive Nord Trade-Mark.

AS&W to Install Morgan Rod Mill in Cleveland

As a major step in modernizing and expanding their production facilities, the **American Steel & Wire Division,** United States Steel Corp. has awarded a contract for a new rod mill to the **Morgan Construction Co., Philip M. Morgan,** President, has announced.

★ ★ ★

The new rod mill will be erected on properties of the present American Steel & Wire, Cuyahoga Works, Cleveland, Ohio, and will substantially increase the plant's rod production. New facilities will include a combination rod mill, billet storage areas and rod storage areas.

★ ★ ★

Electronic and the latest automatic controls will be used extensively in the heating, rolling and cooling processes in the new mill to produce a quality product at mile-a-minute speeds.

★ ★ ★

Steel billets which must be heated before being rolled into rods, will be conveyed through a billet reheating furnace divided into multiple heat zones whose temperature will be closely controlled, much in the manner in which the housewife slowly roasts and then quickly browns a turkey. The billets will be 3¼ inches square and 30 feet long, weighing about ½ ton each.

★ ★ ★

Using a combination of roll or reducing stands, the new mill is expected to send the rod speeding to the coiling reels at a rate in excess of sixty miles an hour. This is in contrast to present equipment where speeds range up to thirty-five miles an hour.

★ ★ ★

The roll stands will be so arranged and equipped with finger tip controls and electronic measuring devices that the rod will literally "float" through the reducing mills. This will insure maximum accuracy in maintaining roundness and size. Rolling range of the new rod mill will be from No. 5 rod (which is about 7/32 of an inch) to 1½".

★ ★ ★

Billets for the new mill will be supplied principally from the Lorain, Ohio Works of the National Tube Division of U. S. Steel. **Floyd A. Garman** is Chief Engineer in charge of the construction. **Walter L. Longnecker** is General Superintendent of Cuyahoga Works. **Harry L. Jenter** is Cleveland District Manager of Operations.

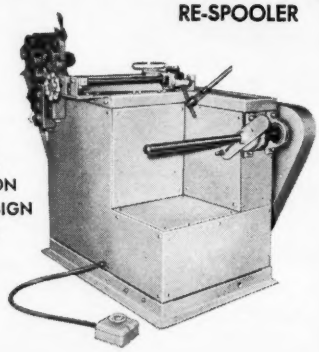
Modern Electroplating

This new book, published by **John Wiley and Sons, Inc.,** 440 Fourth Avenue, New York 16, N. Y. has been compiled by 39 authorities and was edited by **Allen G. Gray,** Technical Editor of "STEEL." It is sponsored by the Electrochemical Society, Inc. of New York City.

★ ★ ★

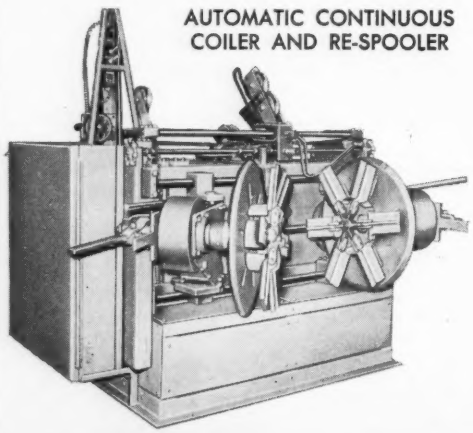
DESIGNED FOR PRODUCTION EFFICIENCY

RE-SPOOLER



- ELECTRIC BRAKE
- VARIABLE SPEED
- CONSTANT FOOTAGE
- PUSH BUTTON CONTROL
- AUTOMATIC ACCELERATION
- RIGHT OR LEFT HAND DESIGN
- SYNCHRONIZED ELECTRIC TRAVERSE

AUTOMATIC CONTINUOUS COILER AND RE-SPOOLER



- FULLY AUTOMATIC
- CAPSTAN OPTIONAL
- AUTOMATIC CROSSOVER
- AUTOMATIC CUTTING
- SYNCHRONIZED ELECTRIC TRAVERSE
- AUTO-RESET PREDETERMINED COUNTER
- REMOVABLE SHAFTS FOR RE-SPOOLING
- ADJUSTABLE COLLAPSIBLE COILING HEADS

WIRE INSULATING MACHINERY, INC.

Division of Machinery Electrification, Inc.

98 UNION STREET WORCESTER 8, MASS.

The book is the only source of up-to-date electroplating practice that emphasizes, in addition to practical aspects, the basic theories of electroplating as understood today. It is a completely modernized revision of the Society's early book of the same title.

★ ★ ★

Its purpose is to present the details of today's commercially available processes for those who are either doing or contemplating doing electroplating work.

★ ★ ★

Besides covering the more common plating materials and processes, the book treats in one chapter the common metals used in plating, including magnesium and aluminum. Each chapter, of which there are 19, gives principles, functions of constituents of bath, operating conditions, maintenance and control, preparation of base metals and finishing of electro deposits with variations inherent in the particular metal under discussion. Both the "engineering" system of weights and measures and the C.G.S. equivalents are given.

★ ★ ★

The book contains 563 pages of text, data and bibliographies and sells for $8.50 per copy.

Bulletin on New Butt Welder

Ames Spot Welder Co., Inc., 1328 58th St., Brooklyn 19, N. Y. has bought out a new resistance portable butt welder that will handle wire in sizes up to 3/16 inches in diameter.

★ ★ ★

Two features of this new welder are a) a built-in grinding wheel to remove the flash burr and b) a double gauge for checking diameters or widths. The machine, which weighs only 31 pounds, is ruggedly constructed and designed so that inexperienced operators can produce perfect welds. It has a wide variety of uses, as products other than wire can also be butt welded.

★ ★ ★

The company has been producing resistance welding equipment for over 30 years and offers a complete line of butt and spot welders for any industrial application.

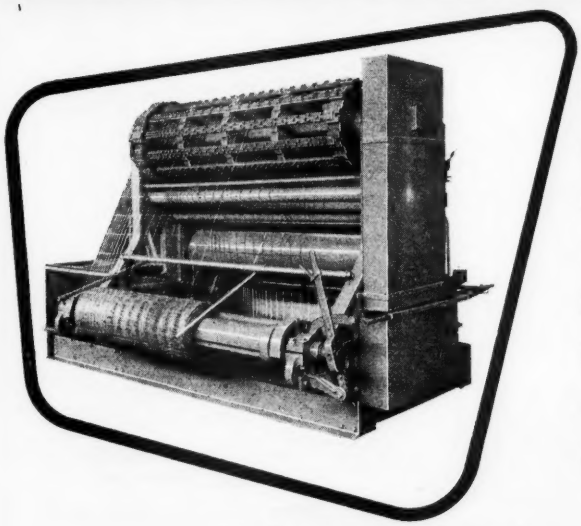
★ ★ ★

The bulletin on the new portable welder or catalogs describing other types of welders are available upon request.

Announces New Packaging, Shipping Developments

American Wheelabrator & Equipment Corp., 1184 S. Byrkit St., Mishawaka, Indiana, has announced a new method for packaging and shipping its Wheelabrator Steel Shot, a blast cleaning and peening abrasive. The new packages consist of 50-pound fiber board cartons. These replace the 100-pound bags that have been used by the abrasives industry for many years. Shipments are now made on disposable pallets holding 1 ton of shot each. The palletization, which formerly was considered as an extra, is performed without charge.

Interlocking FENCE LOOMS



- Fastest — Most Efficient
- Preferred by Leading Mills
- Low Maintenance Cost
- Wrapped Stay Fence
- Straight Stay Wires
- Integrated — Space Saving
- Replaceable Main Bearings
- Single or Double Strands
- Years of Low Cost Production

Write for Detailed Information — Without Obligation

Interlocking Fence Co., Box 8, Morton, Ill.

Specialists In Fence Looms

Heanium

Looking for a better material for insulation, the **Heany Industrial Ceramic Corporation,** New Haven 3, Conn., discovered that, by the use of extreme heat and under great pressure, they could weld minute particles of aluminum oxide into a finished product suitable for a wide variety of applications. A special grade of aluminum oxide of controlled grain size, together with great pressure and heat to bond the particles together, produces a structure that is completely homogeneous and hard as a gem—in fact, a synthetic ruby. By slight variations and additions to the basic materials, maximum hardness for wear resistant applications in many fields are obtained.

★ ★ ★

The addition of one ingredient produces its distinguishing red color. Thus has been formulated what is known as HEANIUM, a synthetic substance next to the diamond in hardness.

★ ★ ★

The next step in its development was the fabrication of the synthetic gem into a thousand different shapes and forms, at attractive and competitive prices. Heany Industrial Ceramic Corporation is now making innumerable articles of Heanium, in all styles and sizes, for both domestic and foreign markets.

★ ★ ★

Its qualities of hardness, density and homogeneity introduced into the wire and textile industries a wear resistant material that can outlast by many times steel or porcelain. In textiles, Heanium compares favorably with carbides, and in the wire industry it is generally found to be equal and, in some cases, depending on the application, superior to carbides.

★ ★ ★

Surface finishes can be supplied from a matt or satin finish to a very high polish obtained with diamond powders. The high polish given to Heanium increases its diamond-like qualities, and decreases static, fraying and metal pick-up.

Monsanto Building New Polyethylene Plant

Selection of Texas City, Tex., as the site for Monsanto Chemical Company's first polyethylene production plant has been announced.

★ ★ ★

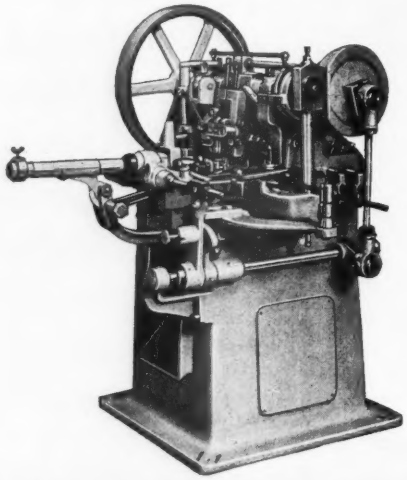
Robert K. Mueller, general manager of Monsanto's Plastics Division, said that construction work is now under way. Contractor is Farnsworth and Chambers of Houston, Tex.

★ ★ ★

Located adjacent to Monsanto's existing Texas City plant, the new polyethylene unit, operated by the Plastics Division, is expected to produce commercial quantities of polyethylene starting the fourth quarter of 1954. Plans announced last March set initial annual capacity at about 66 million pounds, with a 50 per cent increased capacity scheduled for 1957. At that time the site had not been chosen.

J.G. KAYSER
MASCHINENFABRIK · NÜRNBERG

Machines for Making Steel Screws:
Double Stroke Heading Presses
Head Trimming and Shank Reducing Machines
Machines for Rounding off the End
Screw-Head Slotting Machines
Thread Rolling Machines
High Efficiency
High Speed Wire Nail Presses
Roofing Nail Machines
Tack Machines for Making:
Shoe Tacks—Cut Tacks—Wire Tacks



Machine for Cut Tacks and Cut Nails working from Hoop-Iron and Sheet Metal Strip—Model TM (TALUS)

Machines for Making Wood Screws:
Single Stroke and Double Stroke Presses
Head Turning and Slotting Machines
Thread Cutting Machines
Thread Milling Machines
Wire Forming Machines
Staple Making Machines
High Speed Barbed Wire Machines
Wire Straightening and Cutting Machines

ALLCASE High Production Batch Furnace

A new bulletin on the ALLCASE batch type controlled atmosphere furnace has just been released by **Surface Combustion Corporation,** Toledo, Ohio.

* * *

It is a six-page illustrated folder that completely describes the features of the standard and heavy duty sizes of this radiant tube heated furnace, designed for the heat-treatment of bolts, nuts, screws, chains, links, gears and other small parts. Equipped with a recirculating fan and an enclosed quench it can be used for all types of controlled atmosphere steel treatments. Included in this bulletin are detailed construction drawings and photographs of typical process applications.

* * *

For copies of Bulletin SC-163 write direct to Advertising Department, Surface Combustion Corporation, Toledo 1, Ohio.

Address Changes

Firth Sterling Inc. has announced a change of address for their Southern District Office. New address is 2201 Highland Avenue, Birmingham 5, Alabama. They were formerly located at 2308 Fourth Avenue North, Birmingham, Alabama.

* * *

Firth Sterling is one of the country's leading manufacturers of tool and die steel, sintered carbides, and high temperature materials.

Product Research and Development Department Organized

The Colorado Fuel and Iron Corporation has organized a new department to coordinate and expand product research and development, **A. F. Franz,** President of the Corporation, has announced.

* * *

The new organization, a part of the Executive Department, will headquarter at Washington, D. C., and operate under the direction of **Howard J. Davis,** Assistant to the President. In addition to this activity, Mr. Davis will continue as the Corporation's Washington representative for all activities excepting sales.

* * *

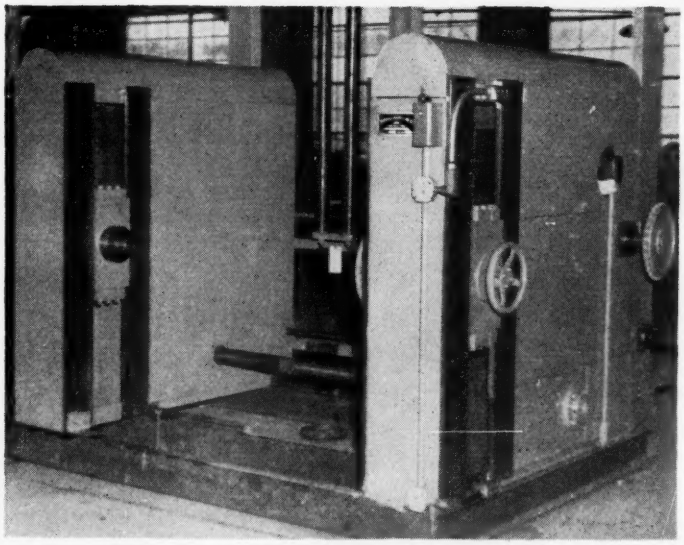
This department will further the Corporation's product diversification objectives. The Washington location will enable C. F. & I. to broaden its services in the various government agencies and to work more closely with various government and private research and development organizations.

Receives Award for Wire "Pay off Barrel"

At the recent meeting in Chicago of the Society of Industrial Packaging and Material Handling Engineers, **W. H. Richardson,** Vice President of **The Driscoll Wire Company,** Shelton, Conn., was awarded first prize for a new packaging process called the "Pay off Barrel."

* * *

NEW— HUGHESVILLE LET-OFF STAND



- **40" TO 84" DIAMETER REEL CAPACITY**
- **MANUALLY ADJUSTABLE TO ANY REEL WIDTH**
- **6 TO 1 VARIABLE SPEED HEAVY DUTY TRAVERSE**
- **MOTORIZED REEL LIFT**
- **ANTI-FRICTION BEARINGS THROUGHOUT**
- **PRIME DRIVE ADAPTABLE TO CUSTOMERS' REQUIREMENTS**

Write for details

HMT — ESTABLISHED 1846 — HUGHESVILLE MACHINE & TOOL COMPANY — WIRE & PROCESS MACHINERY

HUGHESVILLE MACHINE & TOOL CO.

54 W. Academy Street, Hughesville, Pa. Tel.: 129-A

Exclusive Representation in Canada by

THE LARSON COMPANY, TORONTO, CANADA

The method involves a means to store, ship and dispense steel wire or other strand materials without using reels or spools. The container will take 300 to 600 pounds of wire, so laid that the terminal end may be pulled through or to a processing machine. It is suitable for shipment to a user or for interplant transfer use.

★ ★ ★

The container, weighing about 22 pounds, is of variable dimensions, but for a 500 lb. coil of wire measures approximately 19" in diameter by 30" high. It is of fibre construction. Mr. Richardson's entry was in Materials Handling Group No. 7.

Technical Report on Chrome Carbide

A technical report on Carboloy grade 608 cemented chrome carbide, a comparatively new powdered metal that is highly resistant to corrosion and erosion has been issued by the Carboloy Department of General Electric Company, Detroit.

★ ★ ★

The report, CC-100, includes data on composition, manufacture, physical properties, application suggestions, finishing techniques, methods of attachment and general background material on the Carboloy Department.

New Wire Straightening and Cutting Machines Announced

Mettler Machine Tool, Inc., New Haven 11, Conn., announces two completely redesigned, dual control Shuster Wire Straightening and Cutting Machines. The No. 3AV machine handles up to ½" diameter wire, maximum; No. 4AV handles up to 11/16" diameter. Both models also straighten and cut square and hex stock.

★ ★ ★

Each machine contains two Variable Speed Units placed together at the front, allowing central control, while machine is operating, of both speed of feed, and cut-off feed. Infinite variable speeds of both operations concurrently are thus obtained.

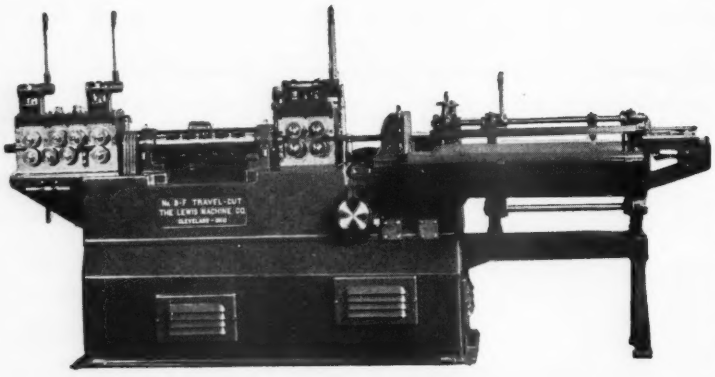
★ ★ ★

The newly designed machines are of rigid unit construction. A welded steel base provides the mounting for the roll housing unit, feed roll, rotary flier, cut-off mechanism and Variable Speed Units. Complete information on these two SHUSTERS appears in the new Bulletin No. 37V just released.

Fast, Accurate, Economical

STRAIGHTENING and CUTTING

with LEWIS TRAVEL-CUT



22 Models to handle from .012" to ¾" Round, Hex, Flat, Shapes.

Simple in design, rigid in construction, Lewis TRAVEL-CUT will deliver continuous dependable service under the most severe, high production conditions—day in, day out. Feeds wire from the coil, straightens accurately, gauges to uniform length, and cuts clean without stopping the wire. For steel, brass, aluminum and alloy wire. Cut your cutting costs with the Lewis TRAVEL CUT. Full details on request.

Exclusive Representatives

EAST: Penn Machinery Co., 117 North Third Street, Philadelphia 6, Penn.

MIDDLE WEST: Steel & Wire Machinery Co., 15457 Euclid Ave., Cleveland 12, O.

CENTRAL: Moslo Machinery Co., 2443 Prospect Avenue, Cleveland 15, Ohio.

WEST COAST: Hoffman & Heartt, 3065 So. Grand Ave., Los Angeles 7, California.

CANADIAN: Empire Engineering Co., 738 Dundas St., East, Toronto, Ont., Canada

CONTINENTAL EUROPE: Gaston E. Marbaix Ltd., Devonshire House Vicarage Crescent, London S. W. 11, England.

The LEWIS MACHINE Company

3441 E. 76th Street, Cleveland 27, Ohio

Also agents in Paris, Stockholm, Rotterdam, Brussels, Zurich, Milan, Bombay and Melbourne

BE SURE YOUR PRODUCTS ARE LISTED IN THE 1954

BUYERS' GUIDE

This reference book is widely used throughout the wire industry. Your advertising, in support of your listings, will pay you well. Forms close Jan. 29th.

Write for rates.

WIRE & WIRE PRODUCTS

453 Main St. • Stamford, Conn.

Personalities

(*Continued from page* 82)

Windsor to Head Wire Equipment Division of Michigan Oven

Michigan Oven Company, Detroit, designers and builders of ovens for industrial heating and processing, announces the appointment of **C. A. Windsor** to the position of Manager of the company's **Wire Equipment Division.**

★ ★ ★

His appointment signifies another step in MOCO'S advancement in this field. The company has pioneered in this field.

★ ★ ★

Mr. Windsor brings to MOCO an excellent background that fits him for his new position. For twenty years he has been connected with insulated wire and industrial heating engineering—five years with the Belden Manufacturing Company and the last seven years with Western Electric Company in wire enameling.

★ ★ ★

Prior to these affiliations he spent one and one-half years with the Bendix Aviation Corporation and eight years at General Electric in heating and control application. Mr. Windsor is a graduate of the University of Michigan.

To Head Sales for Volco

Norman Coates, President of **Volco Brass and Copper Company, Inc.,** Kenilworth, New Jersey, has announced the appointment of **Robert J. Campbell** as Vice President in Charge of Sales.

★ ★ ★

Mr. Campbell was formerly General Manager at New York Brass and Copper Company and prior to that in a sales capacity with Bridgeport Brass Company.

★ ★ ★

Mr. Campbell will make his headquarters at Volco's General Sales Office in Newark, New Jersey.

A.S.&W. Promotes Parey

Stephen Parey, who started as an office boy in the department, has been appointed assistant purchasing agent of the Cleveland and Pittsburgh District of **American Steel & Wire Division, Roger W. Berrett,** purchasing agent of this United States Steel unit, announced.

★ ★ ★

Mr. Parey, a native Clevelander, attended Fenn College. His career in purchasing began in 1936 shortly after he left school.

Carboloy Adds Two Engineers

Two additions to its design and application engineering section have been announced by **Carboloy Department of General Electric Company.** They are **G. D. Barcus** and **Charlas H. Good.**

★ ★ ★

Mr. Barcus was formerly with the company's engineering services division in Schenectady, N. Y.

WIRE SPOOLS, ALL-STEEL, LITHOGRAPHED

Ends and traverses may be shipped separately and assembled easily in your plant on a hand, foot, or power press.
5" and 6½" diameter ends with 1-15/16" diameter traverses.
10½" diameter ends with 3½" diameter traverses.
Traverse lengths up to 12".

J. L. CLARK MANUFACTURING CO.
600 23rd AVENUE • ROCKFORD, ILLINOIS

ANACONDA®

copper and copper alloy

WIRE in all

Commercial Tempers

and Sizes including

Round, Flat, Hexagonal

and Special Shapes.

WIRE FOR SPECIAL PURPOSES

Copper, Brass, Bronze, Everdur and Nickel Silver in special grades for the manufacture of rivets, nails, pins, piano hardware, etc. Fine Wire on spools.

RESISTANCE WIRE

Nickel Silver.

WEAVING WIRE

Bronze (Antique Golden), Brass, Nickel Silver, Everdur*, Phosphor Bronze, Copper and FourdrinierWire.

SPRING WIRE

Brass, Phosphor Bronze, Everdur.

*Trade Mark Reg. U.S. Pat. Off.

THE AMERICAN BRASS COMPANY

General Offices:
Waterbury 20, Conn.

District Sales Offices in Principal Cities

Warehouses in:
Chicago, Cleveland, Milwaukee
Philadelphia, Providence

32212

He holds a B.S. degree in electrical engineering from the University of Florida.

★ ★ ★

Mr. Good spent the past 3 months in the Carboloy training program. He holds a B.S. in mechanical engineering and an M.S. in business administration from the University of Michigan.

Heads Wire and Cable Sales For Copperweld

Announcement has been made by the **Copperweld Steel Company** of the promotion of **F. E. Leib** to manager of sales of the wire and cable division, Glassport, Pa. He was chief electrical engineer during the last 3½ years. Prior to that, Mr. Leib was assistant manager of sales. He comes to his new position with a background of over 25 years' experience in the electrical industry.

★ ★ ★

Other promotions announced at the same time involve **R. C. Ridley,** who was appointed assistant manager of sales and **C. C. Sowards** who was elevated to Eastern sales manager, with headquarters in New York City and **E. G. Elg,** who was made Western sales manager, with offices in Chicago.

Appointed by Sprague

Bruce R. Carlson has been appointed statistical assistant to the president of the **Sprague Electric Co.,** North Adams, Mass.

Engineer Joins Carboloy

David J. Jay, formerly with the aircraft nuclear propulsion project of General Electric's Aircraft Gas Turbine Division, Evendale, O., has joined the Company's **Carboloy Department** as an engineer in the product and process development section.

★ ★ ★

Mr. Jay is a former instructor in mechanical and chemical engineering at the University of Detroit. He holds an M.S. degree from the University of Michigan, and did undergraduate work at Wayne University.

FOR

EXTRA TONNAGE

FROM YOUR BAR STOCK AND WIRE DIES

COAT WITH

BORAX 5 MOL.

Borax and Borax 5 Mol Offer Many Advantages as a Coating Material

Here is dust-free, granular material that is readily soluble in water and dries quickly. The residual film is tight yet pliable... won't flake off! Borax is safe to use, easy to handle, and non-irritating to the skin. You can feed stock faster and you get longer, more accurate performance from your dies.

Check these advantages of borax-coated stock:

- COMPATIBLE WITH DRAWING LUBRICANT
- BETTER WORKING CONDITIONS
- FASTER BUTT WELDING
- LONGER DIE LIFE
- LONGER STORAGE SAFETY
- CLEANER TO HANDLE IN TRANSIT

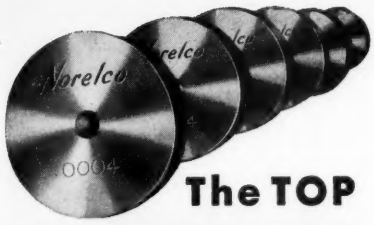
Write for Technical Data Sheet #2 WD

PACIFIC COAST BORAX CO.

DIVISION OF BORAX CONSOLIDATED, LIMITED

NEW YORK • CHICAGO
LOS ANGELES • CLEVELAND
PHILADELPHIA

MANUFACTURERS OF FAMOUS "20 MULE TEAM" PACKAGE PRODUCTS



The TOP
DIAMOND DIES
are made by
PHILIPS

For your most exacting wire drawing requirements, standardize on NORELCO Diamond Dies, made by the master craftsmen of PHILIPS in the world's largest, most modern diamond die factory.

Only the very best South African and Brazilian diamonds are used. Each consists of one closed crystal. Less than .4% of all the diamonds mined meet PHILIPS high quality requirements for purity, structure and shape.

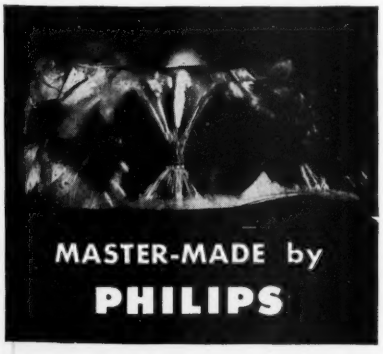
These diamonds are drilled to precision tolerances, varying in proportion to the diameter, normally 0.3 to 3.5 microns. Closer tolerances can be supplied, if required.

Let us quote on your diamond die requirements.

North American Philips Company, Inc.
Elmet Division, Lewiston, Maine

Norelco

Note below the highly polished precision shaped drawing channel of this die for drawing copper which gives a burnished finish to the wire and long life to the die.



To Sell Silicones for GE in Ohio

Richard A. Steenrod, a native of Ohio, has been named silicone sales representative at Cincinnati, according to an announcement by **R. J. Baumann,** sales manager of the General Electric Company's silicone products department.

* * *

Mr. Steenrod is a 1949 graduate of Washington University with a B. S. degree in chemical engineering. He joined General Electric in 1949 as a member of the chemical and metallurgical training program. After completing the course he held various silicone engineering and marketing positions at Waterford.

Fifteenth Diffraction School Well Attended

Over 150 registrants from educational institutions, research organizations, and many types of industrial establishments began a week-long course in X-ray diffraction on October 5, 1953 at the plant of North American Philips Company, Inc., 750 South Fulton Avenue, Mount Vernon, N. Y.

* * *

This is the 15th semi-annual free school to be sponsored by the company's Research & Control Instruments Division on the east coast, an educational program that started in 1946. During August, 1953, Philips sponsored its first school on the west coast in San Francisco and the company plans to repeat this activity once each year.

* * *

Through its X-ray diffraction school, Philips has pioneered in establishing X-ray analysis as a vital tool for production control in all types of plants in this country. No fee is charged for attendance. Leading scientists from cooperating organizations give the basic lectures and the most modern equipment is used in laboratory demonstrations of the latest techniques.

* * *

Philips has made it a tradition to keep the school sessions truly

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educational. The same idea applies to the company's Application Laboratory in Mount Vernon, N. Y. which is open to interested parties the year round. Here, any company may have its peculiar problems subjected to X-ray analysis methods and trained technicians render an unbiased opinion as to the capabilities and limitations of the X-ray instruments with respect to the particular problems under study free of charge.

Leaflet Describes New Portable Base Annealer

An illustrated leaflet, called "A Lee Wilson Case History," has been issued by the **Lee Wilson Engineering Company,** 20005 West Lake Road, Cleveland 16, Ohio.

* * *

It describes a new single-stack portable base system in a convertor type furnace, with three portable bases and three inner covers, with which faster and more even heating is secured, greater efficiency and perfect control of heat is assured. Less floor space is taken up and continuous production is possible with the new annealing furnace.

* * *

A copy of the leaflet may be secured by writing to the company.

New Lever Control for Variable Speed Motors

To maintain automatic speed regulation of mechanisms such as air cylinders, follower rolls and conveyors which have a movement proportional to the desired speed range, a unique level control has been developed for U. S. Varidrive motors. The driven equipment can be mechanically linked to the lever. Maximum and minimum speeds may be pre-set by means of adjustable speed stops located on the exterior. The lever may be assembled by the user in any of four radial positions spaced 90° apart. Full range of speed is achieved with only a 60° arc of the lever. This new speed control is described in Bulletin 1797 just issued by **U. S. Electrical Motors, Inc.,** Box 2058, Los Angeles 54, California.

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50%
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type "M"

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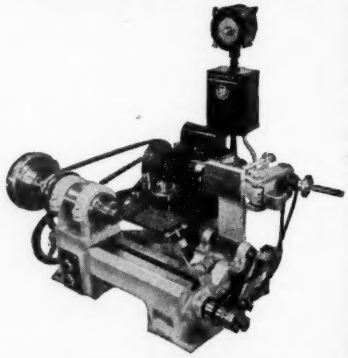
automatic
polishing Machine



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Expanding application of twisting principles to the production of many products is reflected by an ever-increasing demand for both H-D standard equipment as well as machines especially engineered to solve varied production problems. Week after week surprising new uses are developed through the close cooperation of our engineering department with manufacturers in many fields.

Write today for our New Technical Bulletins. Tell us what you make—or contemplate making and your inquiry will receive prompt attention.

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PA.

Handbook of Asbestos Textile

"Handbook of Asbestos Textile" is the title of an 84-page booklet just published by the Asbestos Textile Institute, an association of manufacturers of asbestos textile products. It is intended primarily as a source of useful information about these products and the characteristics which have adapted them to a large and constantly expanding number of diversified uses.

★ ★ ★

The first pages of the handbook are devoted to the mineral asbestos—its origin and major properties—with emphasis on the particular types suitable for textile manufacture. This is followed by sections describing the mining, milling and grading of asbestos fibers for textile purposes and the various processing steps by which the "opened" fibers are converted into finished textile products.

★ ★ ★

The major section covers the products and their applications. It includes a description of each product and points out such advantages as incombustibility, high tensile strength, resistance to rot and decay, thermal stability and other properties that are inherent in the inorganic asbestos fibers of which it is made. Then follows a list of representative uses and information about styles, textures, weaves, sizes, grades, standard packages, etc. A total of twelve asbestos textile products, including roving, yarn, thread, rope, cord, tape, tubing and cloth are covered in this manner.

★ ★ ★

The handbook also contains a section giving the A.S.T.M. Specifications and methods of test used for asbestos textiles, as well as a handy glossary of terms. It is illustrated with many photographs and drawings.

★ ★ ★

Copies are available from any of the member companies of the Institute or by writing to Dr. Myril C. Shaw, Asbestos Textile Institute, School of Ceramics, Rutgers University, New Brunswick, New Jersey, on Company letter-head.

STANNOUS
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Saves Tin!
in liquor finishing
operations
because

M & T Stannous Sulfate — a manufactured chemical—saves tin by doing away with many of the inefficiencies which accompany the treating of feather or flake tin to produce stannous sulfate on the job.

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Baths are operable as soon as materials are dissolved. Solutions can be prepared in advance to produce desired colors and coating thicknesses.

AND, additions are made from stock solutions, assuring quick, complete mixing—eliminating any possibility of materials only partially dissolving in the bath—reducing the chances of miscalculating quantities of materials added.

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Specialists in Tin and Tin Chemicals

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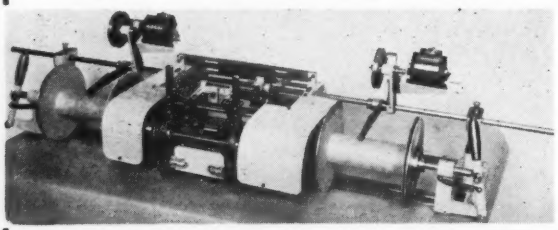

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SPOOLER

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Available with one or two spindles having common traverse and individual drive for each spindle. The spindles are started independently by manual control and halted automatically by predetermining counters and solenoid action. Traverse rates and travel are easily and quickly changed to suit your needs. Screw reversing mechanism controlling traverse can be adapted to wire, tape, plastic, etc. as required.

Further particulars may be had upon request.

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Plants at Union, N.J., Hillside, N.J., West Brookfield, Mass.

Paper on Salt Baths

New developments in electric salt bath furnaces are making many old methods of heat treating obsolete, **A. R. Yerkes,** Application Engineer, **Ajax Electric Company, Inc.,** Philadelphia, told the American Institute of Electrical Engineers at a short course on electrical heating at Indianapolis, November 5, 1953.

★ ★ ★

"An almost infinite variety of results can be obtained by variation of temperatures and the chemical properties of the molten salts," he said.

★ ★ ★

Mr. Yerkes described the basic principles of salt bath processes, the characteristics of the furnaces used and applications for hardening, cyaniding, carburizing, quenching, descaling and many other purposes.

★ ★ ★

Copies of the paper are available from Ajax Electric Company, Inc., Philadelphia 23, Pennsylvania.

Firth Sterling to Make Zirconium Available to Industry

Firth Sterling Inc. has announced that it is installing a major facility for the melting and rolling of zirconium and zirconium alloys with the production to be made available for general industrial use. The Company is taking this step without the support of any Government Agency and its production will not be committed under any Government Contract.

★ ★ ★

To accomplish this program, vacuum melting furnaces with an annual capacity of 360,000 pounds are being installed at the Company's Trafford, Pa. Plant which will convert zirconium sponge to zirconium ingots. The metal will be made available to industry in the form of billets, bars, rods, strip, sheets, wire and tubing. The major portion of the conversion from ingot to rolled product will be carried on at the Company's Tool Steel Plant at McKeesport, Pa., which has been forging, rolling

and drawing this material for more than two years. It is planned that the facility will be in operation by January 1, 1954.

★ ★ ★

In announcing this development **Kenneth D. Mann,** President of Firth Sterling Inc., stated that the decision to install these facilities was made in the belief that the interests of the Atomic Energy Commission and the public can best be served through the cooperation of private industry in supplying special materials as well as technical and metallurgical assistance. He stated that the material will be available to the Atomic Energy Commission as required, but will also be used to supply a latent demand in the Chemical, Petroleum and Aircraft Industries.

★ ★ ★

William E. Hitchcock

William E. Hitchcock, president of the **Atlantic Wire Company,** Branford, Connecticut, died at his home on December 24, 1953, at the age of eighty-four, following an illness of several weeks.

★ ★ ★

Mr. Hitchcock was born in Milford, Connecticut, on September 14, 1869. He had worked for several years for the old **New Haven Wire Company,** before he moved to Branford in 1903, where he established the Atlantic Wire Company, of which he had been president until his death.

★ ★ ★

His prominence in business was recognized by his election to membership in the Rice Leaders of the World, an organization devoted to the promotion of the highest business principles. He was well-known in the New Haven area for his participation in many community and charitable activities.

★ ★ ★

Surviving him are his wife, four daughters, a son and seventeen grandchildren. His son, **William E. Hitchcock, Jr.,** has been Vice President of the Atlantic Wire Company for a number of years.

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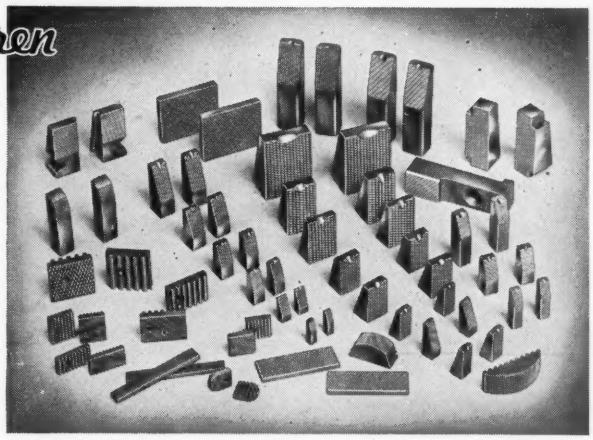
for Wedge Grips, Pullers and Tensile Testing Machines of all makes are available either from stock or manufactured to order. A Sjogren jaw, made to meet your requirements, guarantees you service.



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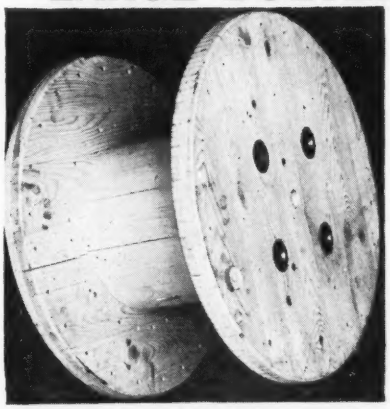
WIRE ROPE
and
ELECTRIC CABLE



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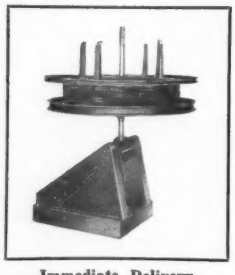
COUNTER-BALANCED WIRE REELS

Takes the Manual Labor out of loading a Reel with Wire. **Just unlock the knurled spindle by a twist of the wrist, tilt the reel assembly 90°, roll coil of wire to reel, lift 6″ on to centering arms, release lock by twist of wrist, use spindle as lever to lift, and the *Weighted Counterbalance does the rest!***



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All welded steel construction—Brake Equipped.

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THE WIRE ASSOCIATION

invites wire men to join the organization and participate in its activities.

Write for a booklet on what it is and how it functions to

RICHARD E. BROWN
Executive Secretary
453 Main Street Stamford, Conn.

Reminiscings of an Old-Timer

(*Continued from page* 38)

system was a big factor even during depressions, of keeping the company running on an even keel. In addition, to add to their security and comfort in the event of illness or accident, including those outside the factory, our company paid all these expenses and naturally, their salaries continued, regardless of length of time. In a few cases, these periods were as long as a full year. The deep appreciation shown during these times of stress proved most gratifying.

★ ★ ★

In closing, I would like to touch upon a few generalities that I feel are very pertinent.

★ ★ ★

At the beginning of the period that Bethlehem Steel was manufacturing heavier sizes of finished high carbon wire, they took me into their confidence telling me that they were not satisfied with the tonnage their mill was turning out of this enormous tonnage wire. In view of the fact that our company was at that time using practically 90% of their rods, manufacturing wires whose characteristics were similar, only that they were finer sizes, they wondered if I would have the time for occasional conferences with them on this subject, as they were carrying on their experiments. Who could refuse such a wonderful opportunity of having the privilege to be in at the outset, in a small way, of this plan?

★ ★ ★

From this point of our relationship, these two men, Louis H. Winkler and John Mordica, continued experiments through their combined efforts and in their visits with me would relay all this to me. This naturally included their successes, as well as their failures. It was during these times that I could lend a hand by explaining the methods I used in perfecting my fine wires. As the meetings progressed, their enthusiasm increased, as they saw how the tonnage of their own product was increasing from month to month. This naturally lead them to greater efforts and I will mention here, that inasmuch as I was trusted not to divulge to anyone, anything concerning this progress, I was in possession from time to time of the tonnage figures. To me it became more and more evident what the combination of these two men was really accomplishing, because the tonnage they attained was way beyond their expectations.

★ ★ ★

Now that John and I had more intimate acquaintanceship with each other's work, I took him on a tour of my mill and the first operation I showed him, was one of our rods frames. He no sooner looked at this than the following conversation started:

John: "Dave, isn't that a green rod?"

Dave: "Yes, John."

John: "It looks pretty fine on your finished load. What carbon is it?"

Dave: "I don't exactly know, but I know that this rod frame is breaking down wire for the tire wire business, so it must be between 66 and 72; as you know I like to have it about the middle of this point."

John: "What size is that finished wire?"

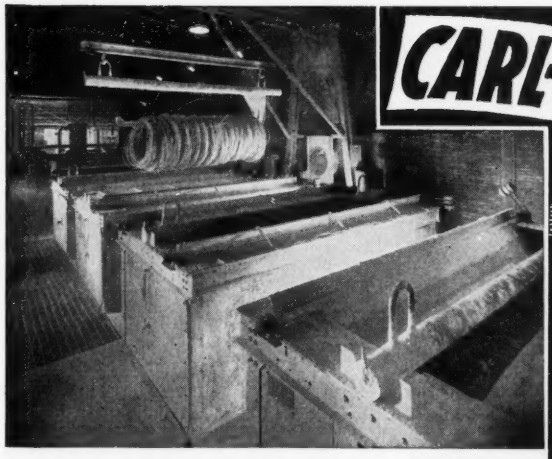
Dave: "Anywhere from 12¼ or a little finer, or probably 12 or just a little bit coarser."

John: "Gosh, I didn't think you could do this without patenting. How long have you been doing this?"

Dave: "Thanks to your good green rods from Sparrows Point, I have been doing it for quite awhile."

John: "Not bad. I don't know of anybody who has been able to do this. It must be something else that you have up your sleeve."

Dave: "Yes, John, I believe that the reason for this accomplishment is that I found out a way to overcome to some extent the stresses that you left in these



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GREATER SPEED AND FUEL ECONOMY PROVES OUTSTANDING ENGINEERING

Carl-Mayer Hi-Speed Rod Bakers have an exclusive heating arrangement, combining faster baking with amazing fuel economy—and a patented Blow-Off feature which removes moisture without bumping or agitating the coils. *WRITE FOR BULLETIN NO. 350.*

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NOTICE TO OUR SUBSCRIBERS

FOR THE FIRST TIME IN OUR HISTORY we are obliged to increase our subscription rates to Wire and Wire Products. Steadily rising costs for printing, engravings and postage necessitate this step, which we regret to have to announce.

★ ★ ★

SECOND class postal rates have already risen 32% and by mid-1954 they will be 62% over those of 1952.

★ ★ ★

HENCE, as of January 1, 1954, the new subscription rates became $8.00 for our domestic and Canadian readers and $10.50 for those abroad. Single domestic copies cost 75¢ each, foreign 90¢ each, except for October and January, the price of which is now $1.25.

★ ★ ★

EVEN at these new rates, we shall be obliged to absorb some of the expense of mailing, as at the present time it costs us $11.00 to fill a domestic subscription for 1 year and correspondingly more for our foreign subscriptions.

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Mason spools save you money because they cost less—yet satisfy your most rigid requirements for non-returnable use!

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MASON CAN COMPANY OF OHIO
Greenville, Ohio

rods when you got through with the rolling."

John: "Yes, but all you have done is clean them and lime them."

Dave: "That's right, John, I did clean, rust coat, and lime them, but it may seem ridiculous when I explain to you the way it is accomplished."

Without this simple formula, I proved time and time again that my breakage was so high that it was of no advantage.

★ ★ ★

I explained the methods I used in the cleaning room and it had nothing to do with lime or coating, but was accomplished by the temperature in the acid-cleaning tub, the timing element of a first process of rust-coating with very cold water and in this rusting period, which was in preparation for again returning to the acid tub for its finishing cleaning, the rest period and the length of time when this wire was submitted to very cold water, was very important, in that I had found that by neglecting to do this and cleaning with a higher temperature in the acid, and I mean only slightly higher, with insufficient rest period in between, that I actually decreased what we had always called brittle or hard spots in the rod that would not stand coldworking without patterning this rod.

★ ★ ★

Here again, as in mentioning other wires, stresses prevented me from drawing green rods until I hit upon the idea I have just described. This particular example I brought out, because I felt it would demonstrate in the simplest terms possible, the part that stresses play in this industry. Had I continued active, I would have pursued the study of stresses to a greater degree, as we are now innocently violating the use of several different applications of equipment, etc. that agitate these causes.

★ ★ ★

Just a word to the young men. Due to the competition of a small mill against the modern giants, the powerful factor for staying in business is QUALITY above all else. Thank you.

If you are engaged in the production of Wire or Wire Products, you are invited to become a member of

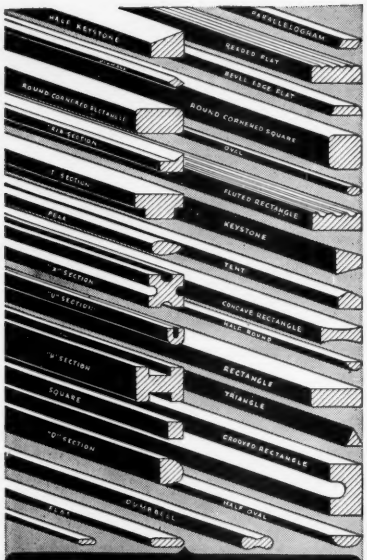
THE WIRE ASSOCIATION

A booklet describing the functions and purposes of the Association will be sent to you upon request, together with a card upon which to make application for membership.

The Association's membership includes men of both ferrous and nonferrous interests — mill operating executives, engineers, metallurgists and chemists.

Send for the booklet today.

THE WIRE ASSOCIATION
RICHARD E. BROWN
Executive Secretary
453 Main Street, Stamford, Conn.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635 E. Polk Street, Milwaukee 2, Wisconsin

Johnson Steel & Wire to Expand at Worcester

A $500,000 expansion and modernization program has been announced by Johnson Steel & Wire Company, Inc., a subsidiary of the Pittsburgh Steel Company. New production facilities will include four Morgan-Connor six block, type C wire drawing machines.

★ ★ ★

The firm is one of the country's largest makers of wire for auto tire beads, as well as one of the largest producers of music wire.

★ ★ ★

Employment at the 27-year-old company, bought by Pittsburgh Steel in 1947, is now up to 500, according to **Joseph R. Carter,** vice president and general manager.

Target for '54

(*Continued from page* 44)

Actually, the return of a buyer's market in steel happens to coincide with our first whiff of freedom from government regulations. Thus, the two combine to present a sort of double-barreled test. Just as we predicted that steel supply would eventually get better, we preached against the encroachment of artificial restraints on a free market. Now our faith in the operation of a free market and our confidence in our ability to measure up to competition in a buyer's market must stand together to face a practical challenge.

★ ★ ★

This is certainly no huge challenge. We do not have any dramatic hour of decision at hand. But we do have a tiny, simple test of our faith in free, competitive enterprise. For my part, I feel we've passed already. Certainly, the only requirement for a passing mark is some good old individual initiative, hard work and salesmanship. Let's zero in on our target for 1954. Let's bombard those customers with service, salesmanship and steel.

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Now wire is being protected in storage and in shipment without oil or grease. VPI vapor permeates area within carton. Makes air and moisture harmless to shiny wire surfaces. For "VPI Facts", write: Angier Corporation, Framingham 3, Mass.
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MUSIC WIRE and SPECIAL WIRES

Music Wire for Industrial Purposes
211 sizes Bright Polished, .0015" to .3125"
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Aluminum—Annealed—Belt Lacing—Brass, Soft and Spring—Copper, Bare and Tinned Coppered Steel Spring—Galvanized—Tinned
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Leader Wires, "Wilstabrite" Stainless and "Silverbrite" Music.

THE MALIN & COMPANY

2514 Vestry Ave. Established in 1884 Cleveland 13, Ohio

The Annual Convention Wire Association

(*Continued from page* 48)

gratified to have these men with us and feel honored by their presence.

★ ★ ★

Those of us in The Wire Association's headquarters who worked with the committees and the speakers in arranging the details of 1953's excellent program are sincerely grateful for the splendid spirit of cooperation shown at every point in its unfoldment through to its successful conclusion. We are also grateful to those who labored long and earnestly as "pinch-hitters" to replace speakers whose papers had to be withdrawn at a late hour for reasons beyond their control. The several who thus filled-in did most creditable jobs.

★ ★ ★

All papers given at the Convention were and will be published in Wire and Wire Products from October, 1953, through February, 1954, including transcripts of the discussions following papers, which are appearing in the January, 1954, issue.

New Brochure on Optical Projection Comparator

Optical Gaging Products, Inc., 26 Forbes St., Rochester 11, N. Y., has issued a new illustrated brochure describing the new optical gaging comparator made by the **American Optical Company.**

★ ★ ★

Complete instructions for the use of the instrument and its importance in revolutionizing tool and gage room techniques is given.

★ ★ ★

Copies of the brochure may be procured by writing the company.

Keystone to Expand Wire Mill

Keystone Steel & Wire Co., Peoria, Ill., plans a $661,000 expansion of its wire mill rod processing facilities, **R. E. Sommer,** president and general manager, announces.

★ ★ ★

The program will include construction of a 36-base gas-fired muffle furnace, the installation of an overhead traveling crane and a new building to house the facilities.

★ ★ ★

Located at 2361 Penobscot Building, the office will be headed by **Ralph K. Ford,** who was with the Steelweld Machinery Division at the Home Office for several years.

Bulletin on Tank Linings and Protective Coatings

Nukem Products Corp., Buffalo 20, N. Y., has issued a technical data bulletin on Nukemite. The material, supplied in three types is described as to properties, applications and methods of applying. Two full pages provide charted information on the properties and application technique.

★ ★ ★

The three types are respectively suited to general protective service, tank linings and severely corrosive conditions. The company invites our readers to send for a copy of the Nukemite bulletin.

Folder on Bunching and Stranding Machines

A new folder has been issued on bunching, stranding and twisting equipment by **Haskell-Dawes Machine Co.,** 2231 E. Ontario St., Philadelphia 34, Pa., entitled "Performance that Commands Top Billing."

★ ★ ★

In it equipment is illustrated, with details of constructional features shown, together with descriptions of the equipment. This and other technical bulletins are available upon request to the company.

Tensolite High-Temperature Cables Now Made with Teflon Outer Jacket

Tensolite super-flexible miniature shielded cables are now available with a tough outer jacket of Teflon. This jacket provides outstanding protection against mechanical damage, at the same time electrically insulating the metallic shield from surrounding objects. Tensolite jacketed cables are supplied in many standard constructions, including single and multiconductor types with conductor sizes ranging from No. 20 to 30 AWG. Both the outer jacket and conductor dielectrics are Teflon permitting continuous operation at temperatures from —90°C. to +250°C. with maximum operating voltages to 1000 volts RMS. The metallic shield is comprised of close woven, highly flexible silver plated copper braid.

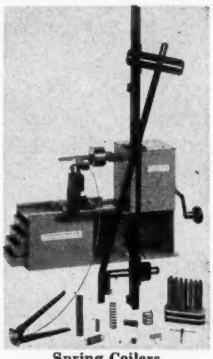
★ ★ ★

The outer jackets on these cables are available in any one of ten solid colors that speed tracing and trouble shooting of complex circuitry. As with all Tensolite cables, these feature extreme flexibility, ease of stripping, high dielectric strength plus extreme temperature range. Samples and literature are available on request.

★ ★ ★

Information on these cables may be secured from the **Tensolite Insulated Wire Co.,** Tarrytown, N. Y.

SPRING MACHINES



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Available in two sizes.

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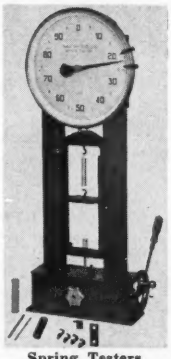

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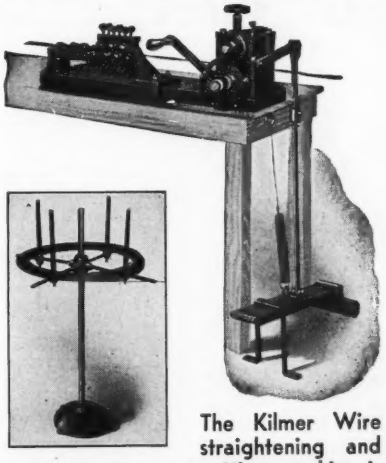

The Kilmer Wire straightening and cutting machine is hand operated and recommended for wire No. 8 to No. 19 gauge.
Wire Reel will handle coils up to 150 lbs. with I.D. adjustments from 7" to 22" and 30" O.D.

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No nails used. *All glued construction.* Made of kiln-dried wood. Special design prevents breaking or splintering of wood, protecting insulated wire from damage.

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New "Super-Cast" Lag Screw Shields

Holub, Industries, Inc., Sycamore, Illinois, are introducing a new line of Lag Screw Shields, said to simplify and speed the setting of cut thread or rolled thread lag screws.

★ ★ ★

Hi "Super-Cast" Shields are made in four sizes—¼" to ½"—short and long. They are precision cast so that threads line up perfectly with threads of lag screws. Rings on the outside are designed to give maximum holding power and re-enforced, so that they will not flatten out as with ordinary shields.

★ ★ ★

"Super-Cast" Shields are made of a special rust-resisting alloy having high tensile and compressive strength.

★ ★ ★

Also included in the line are ⅝" and ¾" shields made of malleable iron.

Wire Association Proceedings Technical Sessions

(*Continued from page* 62)

calculation, but for the purposes of being very conservative, we state 1800 pounds per hour.

The Type 5 cross section also has some other benefits. It is larger as you can see. As a consequence, the filling of the mold is not as critical as it is in a smaller one. You get a better cooling action and your molten pool is better. The elimination of any problems of pipe and velocity are improved. There is also a greater heat retention in the larger cross sectional area than in the smaller, so you can roll it hotter. There seems to be some relation between your heat, the heat at which you enter the mill and your conductivity and the hotter you roll, the better your conductivity, so the general effect of the Type 5 has been very beneficial both from the standpoint of quality and from the standpoint of production.

It is still possible to operate with three men. You have one man feeding your furnaces and a man taking the rod away from the machine. Now, I don't mean to say here that this is all duck soup. I want to point out this is a new art and that you run into problems and have to work them out.

A comparison that occurs to me is the fact that carbide dies were introduced about 20 years ago. Since that time wire drawing machinery has made terrific advances, but the present wire drawing machines did not suddenly burst into full bloom immediately after the development of tungsten carbide dies.

For FINE WIRES from .001" to 1/16"

High Speed Wire Cutters and Benders. Wire Spot Welders and Wire Butt Welders. Ask for test samples. Established 1920.

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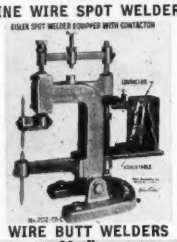

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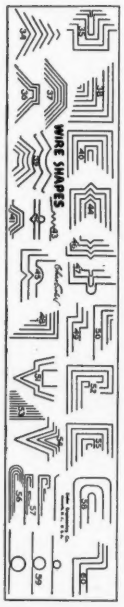

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CUTTING & BENDING MACHINES

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6C WIRE CUTTER

For FREE CUTTING of wires, cable, rods, baling wire and bolts up to medium hardness.

One of the handiest, most useful cutters ever made. Parrot-beak jaw quickly locates material for easy cutting. Protruding tip of jaw prevents wire from slipping, aids in stretching wire and is great for pulling out staples.

Essential equipment for cutting high tensile communication and power wires used in rural electrification (Model 6B with special hard cutting edges). See your supplier.

H. K. PORTER, INC.
Somerville 43, Mass.
Porter Cutters Porter Pruners
PORTER-FERGUSON Autobody and Fender Repair Tools

It takes time in a new art to learn, and everybody who is operating the machines is in the process of learning. That is not only true in the United States, but it is true of Europe and throughout the world, where these machines are in operation.

On zinc and on lead, there is literally no problem. The problem with respect to aluminum where conductivity is not a factor, is no problem. Where you bump into sensitivity and conductivity, everybody is in the process of learning.

The significant thing is that redraw rod is being continuously cast and rolled throughout the world and it is going into ACSR. It meets all the specifications, both with respect to conductivity and the physical requirements.

A Member: Is this the method you are using for producing aluminum wire?

Mr. Nichols: Our process is a process of producing aluminum which we make from a rod by the Properzi process. It is a commercial process and there are no specifications which you use for that quality.

I would like to say this, that the finish on the Properzi rod is very good and we think will be adopted. The cold heading industry uses alloys by and large. That is another big field. In the range of alloys required by the cold heading industry, we think we can meet requirements, but it takes time to work these things out and the only way to get an answer to some of these problems is to go to church. Nobody knows and there is nobody you can ask.

A Member: What is the finest grade wire that has been drawn from the D.C. graded rod?

Mr. Nichols: I would say it is in the finer grade, about .072. Frank, can you answer that problem?

A Member: Well, .077, without annealing. Some have been drawn to .020 with an annealing process. To my knowledge, nothing was drawn smaller than that.

Chairman Whitney: I wonder if you would like to comment at all about your experiments on copper and what the situation is there?

Mr. Nichols: I can only speak generally about copper because as I have pointed out, until a number of things, a number of programs have been tried, we can't say specifically. Experimentation is going on with some encouraging and some discouraging results, for the past year or so. In theory, and I believe myself, that it will be possible ultimately. The problems are greatly more complicated than the problems that were encountered in connection with aluminum; the melding practices and the manner in which you cast—that just has to be worked out. It is not an easy problem and is not going to be solved in fifteen minutes. Rolling is not the problem. The problem is in casting.

Of course, the market for copper wire is in conductor metal, so that purity conductivity is involved, with problems that remain to be solved. Copper has been cast and rolled by this process, but quality is the problem.

Chairman Whitney: I appreciate very much the fine talk that has been given to us, both by Mr. Nichols and Mr. Properzi.

(The meeting recessed at twelve o'clock.)

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These are made for use in extruding machines in covering electric wire with rubber or plastics.

Carbide nozzles are giving 300 times the production secured from those made of tool steels.

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Also, a full line of carbide tooling for the Cold Heading Industry

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Insulation Tester for Magnet Wire Counts Minute Flaws

A pin-hole counter for coated magnet resistance and other fine wires that provides a continuous display of the total number of pin holes (tiny flaws in the insulation that are invisible to the naked eye) is being manufactured by **Peschel Electronics, Inc.**, 13 Garden Street, New Rochelle, N. Y.

★ ★ ★

The instrument can operate at speeds up to 600 f.p.m., and because of a highly sensitive leakage detector, will locate, count and record the dielectric flaws, also flashing a lamp and/or ringing a bell for each pin hole.

★ ★ ★

Because of a high resistance electrode circuit, it is possible to use a very small current (50 microamperes). This promotes safety by eliminating shock hazard and possibility of damage to the wire.

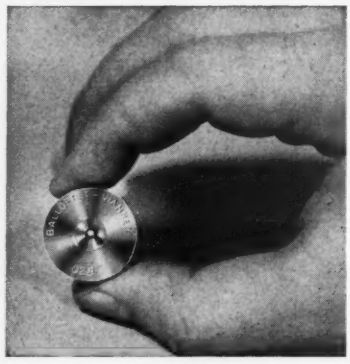
★ ★ ★

An adjustable voltage control is provided, together with recommended voltages for single, double, triple, etc. coated wires.

★ ★ ★

This tester is not designed to compete with or replace the "spark tester", so widely used in the electric wire and cable industry, but has its principal application on fine enameled wires where sparkers are not used.

BALLOFFET VIANNEY WIRE DIE CO., Inc.



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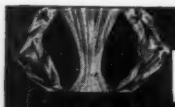

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These are the progressive concerns who stand behind their products and have reputations worth sustaining and you can depend upon them.

Westinghouse Announces Shaker Hearth Furnace

Small, light weight parts can now be continuously hardened in a radiant tube, gas-fired shaker hearth furnace available from the **Westinghouse Electric Corporation.** The furnace has a maximum operating temperature of 1700 degrees F. and is designed for heat treating medium-carbon, high-carbon, and alloy steels without scale or decarburization in an Endogas® atmosphere.

★ ★ ★

In operation, work is loaded on the hearth at the front of the furnace and the reciprocal motion of the shaker charger conveys the parts through the heating chamber until they fall off the discharge end of the hearth into the quenching fluid. The parts are then automatically conveyed from the quench tank on a mesh belt and discharged into tote baskets. The shaker mechanism is mounted on a separate stand so that the furnace receives no shock from the oscillation of the hearth.

★ ★ ★

The estimated production for this furnace at 1600 degrees F. operating temperature, is 400 to 600 pounds per hour. The speed of the work through the furnace is adjusted by varying the operating ratio of the speed reducer which, in turn, varies the frequency of oscillation of the hearth.

★ ★ ★

Typical applications include the hardening of pocket knife blades, small flat springs, screws, bolts and other small hardware. Parts which are round or which will roll en masse are not suitably conveyed by the shaker hearth.

★ ★ ★

The furnace can also be supplied with electrical heating elements for installations where this type of power is more readily available.

★ ★ ★

For further information, write Westinghouse Electric Corporation, P. O. Box 2099, Pittsburgh 30, Pa.

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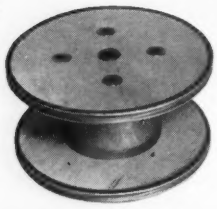

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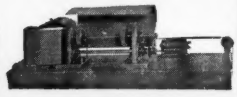

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FURNACES—Induction
Lepel High Frequency Laboratories, Inc., New York, N. Y.

FURNACES—Lead Melting
Electric Furnace Co., Salem, Ohio
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Pot (oil, gas, electric)
Ajax Electric Co., Inc., Philadelphia, Pa.
Holden, A. F., Co., The, Detroit, Mich.
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

FURNACES—Resistance Heating, Strand
(See Annealing Machines)

FURNACES—Salt Bath
Ajax Electric Co., Inc., Philadelphia, Pa.
Electric Furnace Co., Salem, Ohio
Holden, A. F., Co., The, Detroit, Mich.
Rockwell, W. S. Co., Fairfield, Conn.
Surface Combustion Corp., Toledo, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

GALVANIZING EQUIPMENT — (See MACHINERY—Galvanizing Wire)

GRINDERS—Roll
Norton Co., The, Worcester, Mass.

GUIDES—for Wire
Heany Industrial Ceramic Corp., New Haven, Conn.

GUIDE TIPS—For Extruding Machines (See NOZZLES)

HAMMERS—Nail Heading
Pittsburgh Carbide Die Co., Monongahela, Pa.

HAMMERS—Swaging
Sjogren Tool and Machine Co., Auburn, Mass.

HOOKS—Pickling & Liming
Youngstown Welding & Eng'g' Co., Youngstown, Ohio

HOISTS—Electric Travelling
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, Ohio

IMPREGNATING MATERIALS—
Solar Compounds Corporation, Linden, N. J.

INHIBITORS—Pickling
American Chemical Paint Co., Ambler, Pa.
Apex Alkali Products Co., Philadelphia, Pa.
Parkin Chemical Co., The, Pittsburgh, Pa.

INSULATING MATERIALS—
Belding Heminway, New York, N. Y.
Celanese Corporation of America, New York, N. Y.
Electronic Rubber Co., Stamford, Conn.
Glass Fibers, Inc., Toledo, Ohio
Heineman Corp., Oscar, Chicago, Ill.
Merrimac Paper Co., New York, N. Y.
Naugatuck Chemical Division of United States Rubber, Naugatuck, Conn.
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J.
Solar Varnish Corp., Linden, N. J.

INSULATING MATERIALS — Paper—For Electric Wire Cable
Merrimac Paper Co., New York, N. Y.
Solar Compounds Corporation, Linden, N. J.
Solar Varnish Corp., Linden, N. J.

LACQUERING SYSTEMS — See MACH.—Lacquering Electric Wire

LACQUERS—For Electric Wire
New England Lacquer Co., E. Providence, R. I.
Solar Compounds Corporation, Linden, N. J.

LAME—LAHN—
Montgomery Co., The, Windsor Locks, Conn.

LIME—
Warner Co., Philadelphia and Bellefonte, Pa.

LUBRICANTS — For Metal Cutting, Stamping and Drawing
Apex Alkali Products Co., Philadelphia, Pa.
Miller, R. H., Co., Inc., Homer, N. Y.
Nopco Chemical Co., Harrison, N. J.
Standard Industrial Compounds Co., Chicago.

LUBRICANTS—Wire Drawing
(See Compounds—Wire Drawing)

LUBRICANTS—Wire Rope
Swift & Co., Chicago, Ill.

LUMBER—Wire Mill, Carload shipments for lagging and car blocking
Canada Reels, Ltd., Bury, Que., Canada
North Anson Reel Co., No. Anson, Me.

MACHINERY—Armoring (Cable, Wire, Hose)
American Insulating Mach'y Co., Phila., Pa.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc., (used), Pawtucket, R. I.

MACHINERY—Barbed Wire
Glader Machine Works, Chicago, Ill.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Bolts & Rivets
Meyer, Roth & Pastor Maschinenfabrik (Cosa Corporation, New York, N. Y.), Koln-Raderberg, Germany

MACHINERY—Braiding
Fidelity Machine Co., Inc., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Wardwell Braiding Mach. Co., Central Falls, R.I.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bunching
Cook Manufacturing Co., The, Paterson, N. J.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Bundling, Scrap
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Cable, Electric
American Insulating Mach'y Co., Phila., Pa.
Fidelity Machine Co., Inc., Philadelphia, Pa.
Haskell-Dawes Machine Co., Philadelphia, Pa.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Capstans (See Machinery—Winding Wire)

MACHINERY—Chain Making
Meyer, Roth & Pastor Maschinenfabrik (Cosa Corporation, New York, N. Y.), Koln-Raderberg, Germany
Nilson, A. H. Machine Co., Bridgeport, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Closing Rope
Watson Machine Co., Paterson, N. J.

MACHINERY—Coiling Rod
Vaughn Mach'y Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Cold Heading
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Copper Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh.
American Insulating Mach'y Co., Phila., Pa.
Hale and Kullgren, Inc., Akron, Ohio
National Mach'y Exch. (Used), New York.
Syncro Machine Co., Perth Amboy, N. J.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Conn.

MACHINERY—Covering Wire (See MACHINERY—Insulating Wire)

MACHINERY—Cutting
Eisler Engineering Co., Newark, N. J.
Lewis Machine Co., The, Cleveland, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Descaling Rod, Dry
Fisher Associates, New York, N. Y.

MACHINERY—Diameter Testing Continuous
Standard Electronic Research Corp., New York, N. Y.

MACHINERY—Die Making
Boulin, Victor J., Inc., New York, N. Y.
Carboloy Dept. General Electric Co., Detroit, Mich.
Dykrex Corp., Roos Tool & Mfg. Div., Newark, N. J.
Firth Sterling, Inc., Pittsburgh, Pa.
Kelly Wire Die Corp., New York, N. Y.
Nord International Corp., Montclair, N. J.
Wayne Wire Die Co., Hillside, N. J.

MACHINERY—Draw Benches
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Dry Blending Plastics
Robinson Manufacturing Co., New York, N. Y.

MACHINERY—Edging (See MACHINERY — Tandem Rolling and Edging Mills)

MACHINERY—Enameling
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Industrial Ovens, Inc., Cleveland, Ohio

MACHINERY—Extruding
Aetna-Standard Engineering Co., Pittsburgh.
Davis-Standard Sales Corp., Mystic, Conn.
Hale and Kullgren, Inc., Akron, Ohio
National Rubber Machinery Co., Akron, Ohio
Royle, John, & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Fence
Glader, Wm., Machine Works, Chicago, Ill.
Interlocking Fence Co., Morton, Ill.
Malmedie Maschinenfabrik, Dusseldorf, Germany
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Filament Coil Winding
Eisler Engineering Co., Newark, N. J.

MACHINERY—Flat Wire
Mettler Machine Tool, Inc., New Haven, Conn.
Torrington Mfg. Co., Torrington, Conn.
Wean Equipment Corp. Cleveland, Ohio

MACHINERY—Forming Wire
Baird Machine Co., Stratford, Conn.
Lendt & Co., Inc., New York, N. Y.
Nilson, A. H., Machine Co., Bridgeport, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Galvanizing Wire
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, O.
Wilson, Lee, Engr. Co., Cleveland, Ohio

MACHINERY—Gang Winders
Entwistle, Jas. L. Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Grinding
Norton Co., The, Worcester, Mass.

MACHINERY—Insulating Wire
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis-Standard Sales Corp., Mystic, Conn.
Ets. Pourtier Frères, Romainville, France
Fidelity Machine Co., Inc., Philadelphia, Pa.
Hale and Kullgren, Inc., Akron, Ohio
National Rubber Machinery Co., Akron, Ohio
New England Butt Co., Providence, R. I.
Royle, John & Sons, Paterson, N. J.
Syncro Machine Co., Perth Amboy, N. J.
Wardwell Braiding Mach. Co., Central Falls, R.I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Knitting
Fidelity Machine Co., Inc., Philadelphia, Pa.

MACHINERY—Lacquering Electric Wire
American Insulating Mach'y Co., Philadelphia.
Industrial Ovens, Inc., Cleveland, O.

MACHINERY—Lock Washer
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Looms, Wire Weaving
Interlocking Fence Co., Morton, Ill.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Material Handling
(See Material Handling Equipment)

MACHINERY—Measuring Wire & Cable
Davis Electric Co., Wallingford, Conn.
Durant Mfg. Co., Milwaukee, Wis.
Entwistle, Jas. L. Co., Providence, R. I.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Nail and Tack
Baird Machine Co., The, Stratford, Conn.
Glader, Wm., Machine Works, Chicago, Ill.
Meyer, Roth & Pastor Maschinenfabrik (Cosa Corporation, New York, N. Y.), Koln-Raderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany

MACHINERY—Pickling
Chemsteel Construction Co., Pittsburgh, Pa.
Youngstown Welding & Eng'g Co., Youngstown, Ohio.

MACHINERY—Pin Making
Baird Machine Co., The, Stratford, Conn.

MACHINERY—Pointing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale and Kullgren, Inc., Akron, Ohio

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

Meyer, Roth & Pastor Maschinenfabrik (Cosa Corporation, New York, N. Y.), Koln-Raderberg, Germany
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Poultry Wire Fencing
Interlocking Fence Co., Morton, Ill.
Malmedie Maschinenfabrik, Dusseldorf, Germany
Wean Equipment Corp., Cleveland, O.

MACHINERY—Pre-Heater for Wire (for Extrusion of Plastics)
Industrial Ovens, Inc., Cleveland, Ohio
National Rubber Machinery Co., Akron, Ohio

MACHINERY—Re-Spoolers
Boyd & Sons Manufacturing Corp., Philadelphia, Pa.
Davis Electric Co., Wallingford, Conn.
Eisler Engineering Co., Newark, N. J.
Emory, Robert J., Co., Newark, N. J.
Entwistle, Jas. L. Co., Providence, R. I.
National Mach'y Exch. (Used), New York, N. Y.
Steel Equipment Co., Cleveland, Ohio
Vaughn Machinery Co., Cuyahoga Falls, O.
Watson Machine Co., Paterson, N. J.
Wean Equipment Corp., Cleveland, Ohio
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

MACHINERY—Rod Mill
Morgan Construction Co., Worcester, Mass.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Rolling Mill
Morgan Construction Co., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Engineering Co., Cleveland, Ohio

MACHINERY—Rubber Insulating
Davis-Standard Sales Corp., Mystic, Conn.
National Rubber Machinery Co., Akron, Ohio
Royle, John & Sons, Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spark Testing
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Federal Manufacturing Co., Wallingford, Conn.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Spring Making
Carlson Company, The, New York, N. Y.
Lendt & Co., Inc., New York, N. Y.
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Torrington Mfg. Co., Torrington, Conn.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.
Wafios, Maschinenfabrik, Reutlingen 3, Wurtt., Germany.

MACHINERY—Straightening & Cutting
Kilmer, M. D., & Co., Cleveland, Ohio
Lewis Machine Co., The, Cleveland, Ohio
Medart Co., The, St. Louis, Mo.
Mettler Machine Tool Co., New Haven, Conn.
Meyer, Roth & Pastor Maschinenfabrik (Cosa Corporation, New York, N. Y.), Koln-Raderberg, Germany
National Mach'y Exch. (Used), New York, N. Y.
Wells, Frank L., Co., Kenosha, Wisc.

MACHINERY—Stranding
Haskell-Dawes Machine Co., Philadelphia, Pa.
Hughesville Machine & Tool Co., Hughesville, Pa.
Maillefer S. A., Renens-Lausanne, Switzerland.
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Robinson Manufacturing Co., New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.

MACHINERY—Swaging
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Take-Up and Pay-Out
Aetna-Standard Engineering Co., Pittsburgh, Pa.
American Insulating Mach'y Co., Phila., Pa.
Davis Electric Co., Wallingford, Conn.
Davis-Standard Sales Corp., Mystic, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Hale & Kullgren, Inc., Akron, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Robinson Manufacturing Co., New York, N. Y.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

MACHINERY—Taping
American Insulating Mach'y Co., Phila., Pa.
Ets. Pourtier Frères, Romainville, France
New England Butt Co., Providence, R. I.
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

MACHINERY—Testing, Physical
Scott Testers, Inc., Providence, R. I.

MACHINERY—Tinning Wire
American Insulating Mach'y Co., Phila., Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Tinsel Rolling Mills
American Insulating Mach'y Co., Phila., Pa.

MACHINERY—Trolley Wire
Torrington Mfg. Co., Torrington, Conn.
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill, Cold Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale & Kullgren, Inc., Akron, Ohio
Mettler Machine Tool, Inc., New Haven, Conn.

MACHINERY—Twinning
(See Mach.—Bunching)

MACHINERY—Twisters, Wire
Cook Manufacturing Co., The, Paterson, N. J.
Davis Electric Co., Wallingford, Conn.
Federal Manufacturing Co., Wallingford, Conn.
Haskell-Dawes Machine Co., Philadelphia, Pa.

MACHINERY—Used
National Machinery Exchange, New York, N. Y.
Wire & Textile Machy., Inc., Pawtucket, R. I.

MACHINERY—for Wire Welding (See WELDERS—Butt and Spot)

MACHINERY—Winding Wire
Eisler Engineering Co., Newark, N. J.
Entwistle, Jas. L., Co., Providence, R. I.
Federal Manufacturing Co., Wallingford, Conn.
New England Butt Co., Providence, R. I.
Standard Mill Supply Co., Pawtucket, R. I.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

MACHINERY—Wire Bending
Eisler Engineering Co., Newark, N. J.
Kilmer, M. D., & Co., Cleveland, Ohio

MACHINERY—Wire Drawing
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Cook Manufacturing Co., The, Paterson, N. J.
Hale & Kullgren, Inc., Akron, Ohio
Herborn, Herborn, Germany
Morgan Construction Co., Worcester, Mass.
National Mach'y Exch. (Used), New York, N. Y.
Scudder, E. J., Fdry. & Mach. Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Steel Equipment Co., Cleveland, Ohio
Syncro Machine Co., Perth Amboy, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Wean Equipment Corp., Cleveland, Ohio

MACHINERY—Wire Forming
Baird Machine Co., The, Stratford, Conn.
Kilmer, M. D., & Co., Cleveland, Ohio
National Mach'y Exch. (Used), New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Wire Rope
Milton Machine Works, Inc., Milton, Pa.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wrapping with Paper
Angier Corporation, The, Framingham, Mass.
Lendt & Co., Inc., New York, N. Y.
Terkelsen Machine Co., Boston, Mass.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MILLS—Tandem, Rolling & Edging
Wean Equipment Co., Cleveland, Ohio

NAIL TOOLING—Tungsten Carbide
Firth Sterling, Inc., Pittsburgh, Pa.
Pittsburgh Carbide Die Co., Monongahela, Pa.

NAILS—Wire
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Keystone Steel & Wire Co., Peoria, Ill.
Wickwire Brothers, Inc., Cortland, N. Y.

NOZZLES—For Extruding Machines
Wire Tool Div., Bridgeport Jig Boring Co., Bridgeport, Conn.

OVENS—Cable Lacquering
American Insulating Mach'y Co., Phila., Pa.
Carl-Mayer Corp., The, Cleveland, Ohio.
Industrial Ovens, Inc., Cleveland, Ohio
Morrison, John R., Industries, Inc., Cleveland, Ohio
Westinghouse Electric Corp., Industrial Heating Div., Meadville, Pa.

OVENS—Rod Bakers
Carl-Mayer Corp., The, Cleveland, Ohio
Morrison, John R., Industries, Inc., Cleveland, Ohio

OVENS—Welding Rod Coating
Carl-Mayer Corp., The, Cleveland, Ohio
Industrial Ovens, Inc., Cleveland, Ohio
Morrison, John R., Industries, Inc., Cleveland, Ohio

PAINT—Acid Proof
Ceilcote Company, Cleveland, Ohio
Nukem Products Corporation, Buffalo, N. Y.

PAINT BONDING CHEMICALS—
American Chemical Paint Co., Ambler, Pa.

PAINTS—Heat Resisting
American Chemical Paint Co., Ambler, Pa.
Solar Compounds Corp., Linden, N. J.

PAPER—Creped Wrapping
Angier Corporation, The, Framingham, Mass.
Terkelsen Machine Co., Boston, Mass.

PAPER—For Coil Wrapping and Corrosion Prevention
Angier Corporation, The, Framingham, Mass.
Terkelsen Machine Co., Boston, Mass.

PATENT ATTORNEYS—
Lancaster, Allwine & Rommel, Washington, D. C.

PAY-OUT SYSTEMS—(See MACHINERY—Take-Up & Pay-Out)

PHOSPHATE COATING CHEMICALS — (See COMPOUNDS — Phosphate Coating)

PICKLING COMPOUNDS—
See (Inhibitors—Pickling)

PICKLING—Hooks, etc. Acid Resisting
Youngstown Welding & Eng'g Co., Youngstown, Ohio.

PICKLING TANK LININGS—
Chemsteel Construction Co., Pittsburgh, Pa.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio
Nukem Products Corporation, Buffalo, N. Y.

PIPES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

PLASTICS—for Wire Insulation
Naugatuck Chemical Division of United States Rubber, Naugatuck, Conn.

POTS—Lacquer
Industrial Ovens, Inc., Cleveland, Ohio

PRESSES—Hydraulic and Mechanical
Aetna-Standard Engineering Co., Pittsburgh, Pa.
Hale & Kullgren, Inc., Akron, Ohio

PULLERS AND GRIPS—For Wire
Morgan Construction Co., Worcester, Mass.
Scudder, E. J. Fdry & Mach. Co., Trenton, N. J.
Sjogren Tool and Machine Co., Auburn, Mass.
Sleeper & Hartley, Inc., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Wean Equipment Corp., Cleveland, Ohio

REEL AND TENSION STANDS—
Davis Electric Co., Wallingford, Conn.
Entwistle, Jas. L. Co., Providence, R. I.
Fidelity Machine Company, Inc., Philadelphia.
Industrial Ovens, Inc., Cleveland, Ohio
Kilmer, M. D., & Co., Cleveland, Ohio
Roll-A-Reel, Cincinnati, Ohio
Sleeper & Hartley, Inc., Worcester, Mass.
Standard Mill Supply Co., Pawtucket, R. I
Syncro Machine Co., Perth Amboy, N. J.
Watson Machine Co., Paterson, N. J.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

REEL CRUTCHES—
Roll-A-Reel, Cincinnati, Ohio
Watson Machine Co., Paterson, N. J.

REELS & SPOOLS—Aluminum Alloy
Acrometal Products, Inc., Minneapolis, Minn.
Hubbard Spool Co., Garrett, Ind.
Milton Machine Works, Inc., Milton, Pa.

REELS & SPOOLS—Annealing and Stranding
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Ind.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

WHERE TO BUY, Continued

For more complete information, consult the annual Wire and Wire Products Buyers' Guide.

REELS—Metal Bound
Canada Reels, Ltd., Bury, Que., Canada
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., Wm., Westport, Mass.
North Anson Reel Co., No. Anson, Me.

REELS—Plywood
Carris Reels, Inc., Rutland, Vt.
Hubbard Spool Co., Garrett, Ind.
McCaskie, Inc., Wm., Westport, Mass.
Nelson Company, The, Baltimore, Md.
Winchester Reel Co., Ashuelot, N. H.

REELS & SPOOLS—Steel (All Types)
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Clark, J. L. Mfg. Co., Rockford, Ill.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Ind.
Mason Can Company, East Providence, R. I.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio

REELS—Wire Mill
Acrometal Products, Inc., Minneapolis, Minn.
Apco Mossberg Co., Attleboro, Mass.
Bridge Mfg. Co., The, Hazardville, Conn.
Canada Reels, Ltd., Bury, Que., Canada
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River, Minn.
Howsam Spool Co., Aurora, Ill.
Hubbard Spool Co., Garrett, Ind.
Mason Can Company, East Providence, R. I.
McCaskie, Inc., Wm., Westport, Mass.
Mettler Machine Tool, Inc., New Haven, Conn.
Milton Machine Works, Inc., Milton, Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
North Anson Reel Co., No. Anson, Me.
Republic Steel Corp., Pressed Steel Div., Niles, Ohio
Winchester Reel Co., Ashuelot, N. H.

REELS & SPOOLS—Wooden
Acrometal Products, Inc., Minneapolis, Minn.
American Woodworking Co., Chicago, Ill.
Bridge Mfg. Co., Inc., The, Hazardville, Conn.
Canada Reels, Ltd., Bury, Que., Canada
Carris Reels, Inc., Rutland, Vt.
Durkee Mfg. Co., Pine River Minn.
Hubbard Spool Co., Garrett, Ind.
Nelson Company, The, Baltimore, Md.
North Anson Reel Co., No. Anson, Me.
Winchester Reel Co., Ashuelot, N. H.

REFRACTORIES—High Temperature
Norton Company, Worcester, Mass.

ROD BAKERS—(See Ovens—Rod Bakers)

RODS—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Pittsburgh Steel Co., Pittsburgh, Pa.

RODS—Wire—Non-Ferrous
Platt Bros. & Co., The, Waterbury, Conn.

RODS—Wire, Steel
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Indiana.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Company, Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

ROPE—Wire
American Steel & Wire Company, Cleveland, O.
Bethlehem Steel Co., Bethlehem, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.

RUBBERS—for Wire Insulation
Naugatuck Chemical Division of United States Rubber, Naugatuck, Conn.

RUST PROOF COMPOUNDS—
(See Compounds—Rust Preventing)

RUST REMOVING COMPOUNDS—
(See Compounds—Rust Preventing)

SALTS—Heat Treating, Descaling, etc.
Holden, A. F., Co., The, Detroit, Mich.

SATURATION SYSTEMS—
Industrial Ovens, Inc., Cleveland, Ohio
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.

SOAPS—Industrial and Wire Drawing
(See Compounds—Wire Drawing)

SODIUM—for Descaling
Holden, A. F., Co., The, Detroit, Mich.

SPOOLS—(See Reels & Spools)

SPOOLS—Stamped Metal for Retail Wire Sales
Clark, J. L. Mfg. Co., Rockford, Ill.
Mason Can Co., East Providence, R. I.

STAMPINGS—Steel
Acrometal Products, Inc., Minneapolis, Minn.
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Roebling's, John A. Sons Corp., Trenton, N. J.
Youngstown Sheet & Tube Co., Youngstown, O.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TANKS—Pickling and Plating
Ceilcote Company, Cleveland, Ohio
Chemsteel Construction Co., Pittsburgh, Pa.
Nukem Products Corporation, Buffalo, N. Y.

TESTERS — INSULATION (See MACHINERY—Spark Testers)

TESTING EQUIPMENT (See MACHINERY Testing, Physical and Diameter Testing)

TESTING EQUIPMENT—Springs
Spring Mfgs. Supply Co., Plainville, Conn.

TINNING PROCESS—
Metal & Thermit Corp., New York, N. Y.

TINSEL—Electric Conductor
Montgomery Co., The Windsor Locks, Conn.

TINSEL WIRE—Resistance, Lame, Decorative Cords Thread—Bare Copper, Silver and False Gold Coated, etc. (See TINSEL—Electric Conductor)

TOOLS—Nail Machine
Pittsburgh Carbide Die Co., Monongahela, Pa.

TOOLS—Spring Forming
Spring Mfgs. Supply Co., Plainville, Conn.

TOOLS—Wire Cutting
Porter, H. K. Inc., Somerville, Mass.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of the Cleveland Crane & Engineering Co., Wickliffe, O.

TRANSMISSIONS—Variable speed (See Machy—Power Transmission)

TRAVERSES & DRUMS—For Reels
(See Drums & Traverses)

TRAVERSE MECHANISMS—
Apco Mossberg Co., Attleboro, Mass.
New England Butt Co., Providence, R. I.
Watson Machine Co., Paterson, N. J.
Wire & Textile Mach'y, Inc. (used) Pawtucket, R. I.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

TUBE BENDERS AND FORMERS—
Kilmer, M. D., & Co., Cleveland, Ohio

VALVES & FITTINGS—Acid Resistant
Haveg Corp., Newark, Del.

VARNISHES—for Electric Wire
N. E. Lacquer Co., E. Providence, R. I.
Solar Varnish Corporation, Linden, N. J.

VULCANIZING PANS AND EQUIPMENT—
American Insulating Mach'y Co., Phila., Pa.
Mossberg Pressed Steel Corp., Attleboro, Mass.
Wire Insulating Machy., Div. of Machinery Electrification, Inc., Worcester, Mass.

WELDERS—Spot and Butt
Eisler Engineering Co., Newark, N. J.
Micro Products Co., Chicago, Ill.

WIRE—Aluminum
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Malin & Co., The, Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, O.

WIRE—Barbed
Interlocking Fence Co., Morton, Ill.

WIRE—Brass
Chase Brass & Copper Co., Waterbury, Conn.
Spencer Wire Corp., Union, N. J.

WIRE—Brush
Spencer Wire Corp., Union, N. J.

WIRE—Cast
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Cold Heading
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A. Sons Corp., Trenton, N. J.
Seneca Wire & Manufacturing Co., Fostoria, O.
Wickwire Steel Div., The Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Copper
Chase Brass & Copper Co., Waterbury, Conn.
Spencer Wire Corp., Union, N. J.

WIRE—Flat, Fine
Elmet Division, North American Philips Company, Inc., Lewiston, Maine
Montgomery Co., The, Windsor Locks, Conn.

WIRE—Forming
Pittsburgh Cut Wire Co., Pittsburgh, Pa.

WIRE—Galvanized
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Manufacturers
American Steel & Wire Co., Cleveland, Ohio
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Continental Steel Corp., Kokomo, Ind.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Johnson Steel & Wire Co., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
National Lock Washer Company, The, Newark, N. J.
North American Philips Co., Inc., Elmet Division, Lewiston, Me.
Pittsburgh Steel Co., Pittsburgh, Pa.
Roebling's, John A., Sons Corp., Trenton, N. J.
Seneca Wire & Manufacturing Co., Fostoria, O.
Spencer Wire Corp., Union, N. J.
U. S. Steel Co., N. Y., N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Music
American Steel & Wire Co., Cleveland, Ohio
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Malin & Co., The, Cleveland, Ohio
Seneca Wire & Manufacturing Co., Fostoria, O.
Spencer Wire Corp., Union, N. J.

WIRE—Nickel Silver and Phosphor Bronze
Chase Brass & Copper Co., Waterbury, Conn.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Malin & Co., The, Cleveland, Ohio

WIRE—Oil Tempered
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Special Shapes
Charter Wire, Inc., Milwaukee, Wisc.
Continental Steel Corp., Kokomo, Ind.
National Lock Washer Company, The, Newark, N. J.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Continental Steel Corp., Kokomo, Ind.
Johnson Steel & Wire Co., Inc., Worcester.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Stainless Steel
American Steel & Wire Co., Cleveland, Ohio
Firth Sterling, Inc., Pittsburgh, Pa.
National Lock Washer Company, The, Newark, N. J.
Pittsburgh Steel Co., Pittsburgh, Pa.

WIRE—Steel—Also Coppered and Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Seneca Wire & Mfg. Co., Fostoria, Ohio
Spencer Wire Corp., Union, N. J.
U. S. Steel Export Co., New York, N. Y.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

WIRE—Straightening and Cutting
Colorado Fuel and Iron Corporation, Pacific Coast Division, Oakland, Calif.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Steel Div., Colorado Fuel & Iron Corp., New York, N. Y.

WIRE—Tungsten
North American Philips Co., Inc., Elmet Division, Lewiston, Me.

WIRE—Zinc
Platt Bros. & Co., The, Waterbury, Conn.

WRAPPING PAPER—Creped (See PAPER—Creped Wrapping)

YARNS & TAPES—
Belding Heminway, New York, N. Y.
Celanese Corporation of America, New York, N. Y.
Glass Fibers, Inc., Toledo, Ohio
Heineman Corp., Oscar, Chicago, Ill.

YARN TESTERS—
Scott Testers, Inc., Providence, R. I.

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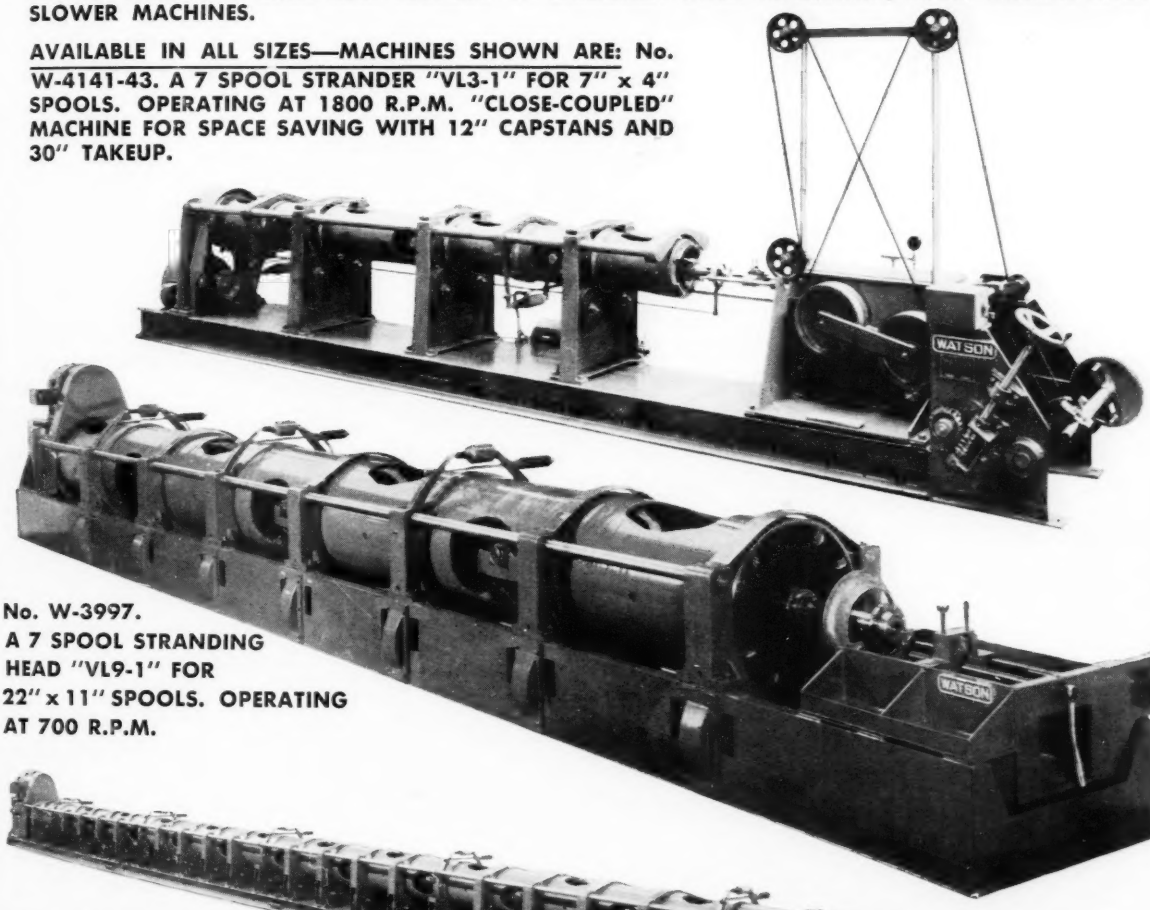
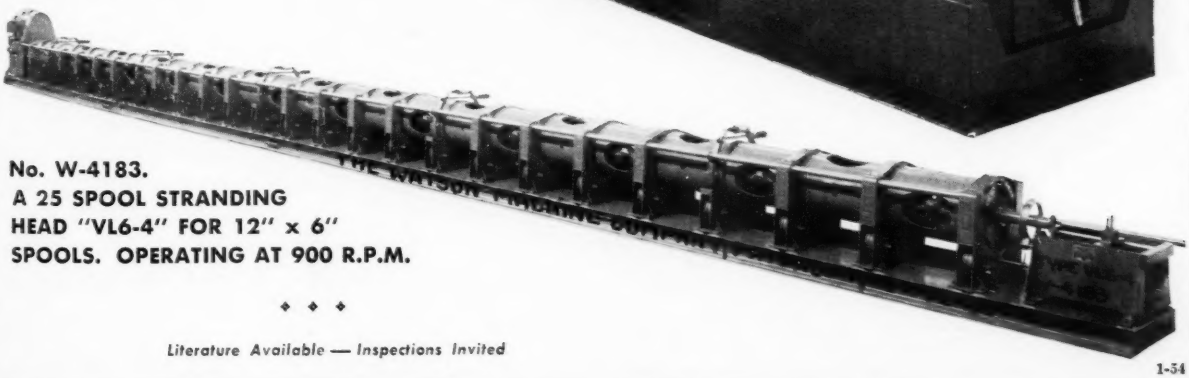


No. W-3997. A 7 SPOOL STRANDING HEAD "VL9-1" FOR 22" x 11" SPOOLS. OPERATING AT 700 R.P.M.



No. W-4183. A 25 SPOOL STRANDING HEAD "VL6-4" FOR 12" x 6" SPOOLS. OPERATING AT 900 R.P.M.

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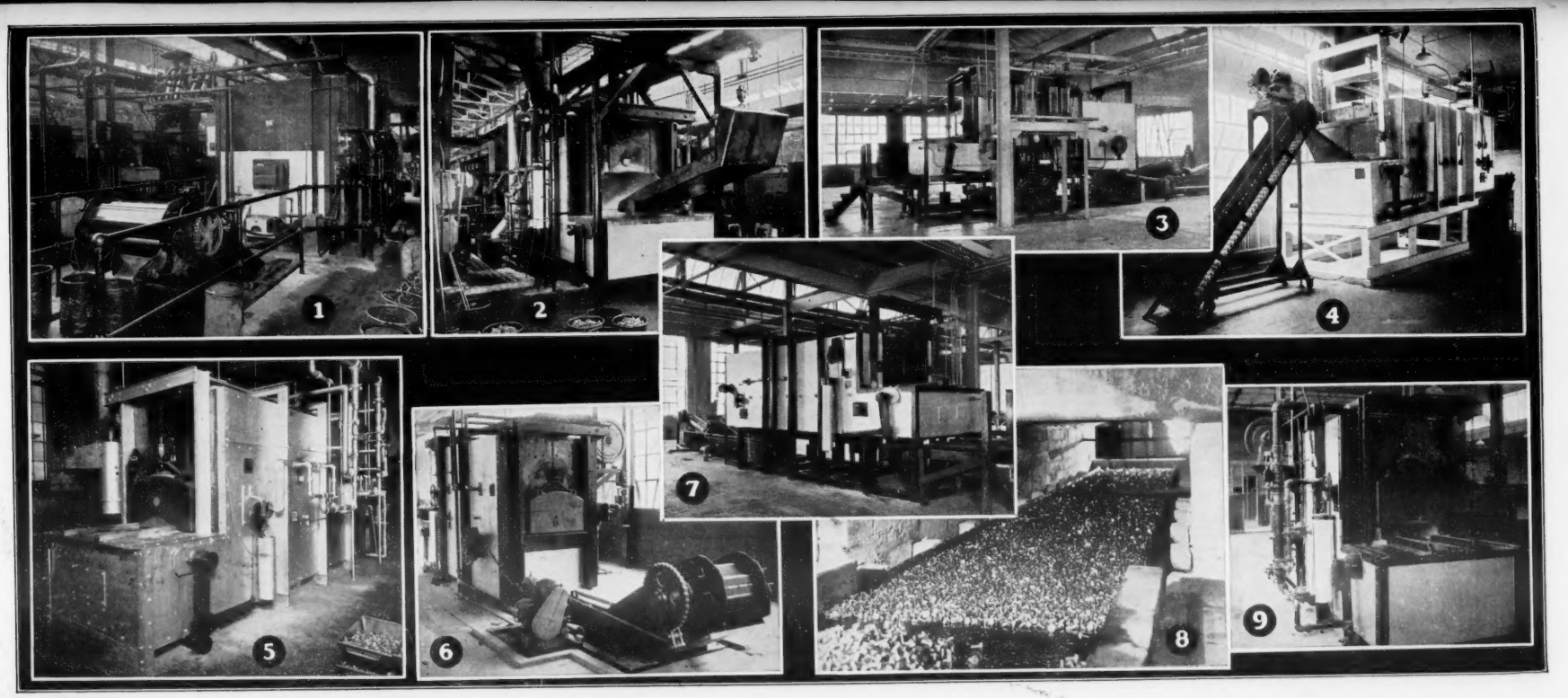
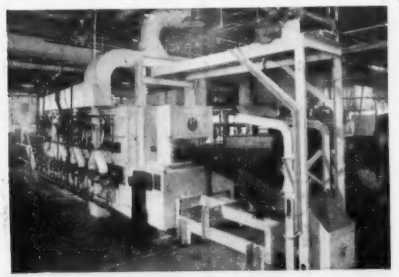
Literature Available — Inspections Invited

1-54



21 Prominent Bolt Manufacturers



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At least 21 prominent bolt manufacturers are meeting their production schedules and their customers' demands for tough, uniformly hard bolts and nuts, by heat treating their products in EF continuous chain belt conveyor furnaces. All the furnaces shown above were installed over 20 years ago—and are still in operation.

Many other parts and products are also being clean and bright hardened uniformly, economically, continuously and without decarburization in hundreds of other EF special atmosphere chain belt furnaces. Some of the parts being handled are listed at right.

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We build this type of furnace in sizes with capacities ranging from 175 to 2,000 pounds per hour . . . either electrically heated or fuel fired. We would like to send complete data on the best size and type to handle YOUR products and production, if interested.
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- Bolts and nuts
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- Flat springs
- Coil springs
- Small forgings
- Valve springs
- Spring plates
- Tractor links
- Rivets and washers
- Wrench & tool parts
- Bearing parts —cups and cones
- Machine gun cartridge clips
- Aircraft engine parts
- Automotive parts
- Rock bits, and many other products